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Major Causes of Cerebral Palsy among the Children of Bangladesh

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Abstract

The most prevalent physical impairment in children is cerebral palsy (CP), although the exact etiology is frequently still a mystery. CP is a diverse collection of clinical symptoms that characterize long-term problems with posture and movement. It is typified by aberrant posture, mobility, and muscular tone, which restricts the affected person's range of activities. The current investigation was conducted to determine the sociodemographic characteristics linked to individuals with cerebral palsy, to investigate the age range most susceptible to the condition, to pinpoint the gender most impacted, and to ascertain the causes and prevalent forms of cerebral palsy in Bangladesh. A total of 100 children with cerebral palsy were selected from the Center for The Rehabilitation of the Paralyzed (CRP) and the outdoor and indoor departments of the Bangladesh Council for Children Welfare (BCCW), Dhaka, for a descriptive cross-sectional study. Out of the 100 children with cerebral palsy, the majority were male. The age range of the maximum percentage of children was 1 to 8 years. The majority of mothers (78%) of children with cerebral palsy had good health. 37% of the children's fathers and 28% of mothers had completed their bachelor's degrees. The majority of mothers, or 93% of them, were housewives. The siblings of the maximum children were all normal or had no disabilities. A maximum of 55% of children had normal deliveries, with no complications occurring during the child's birth. A maximum of 42% of children with cerebral palsy experience postpartum seizures due to birth damage. 45% of newborns suffer from asphyxia. The youngsters had ataxic cerebral palsy, which was the most prevalent kind of the condition. According to the study's findings, the main risk factors in Bangladesh are still infant convulsions, hospital deliveries, birth injuries, and hypoxia.

Keywords: Cerebral palsy, Spastic cerebral palsy, Athetoid cerebral palsy, Mixed cerebral palsy, Bangladesh.

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Introduction

Cerebral palsy (CP) is a condition caused by damage to the brain, usually occurring before, during or after birth (Adogu et al., 2015; Mithun et al., 2023a). It results in sensory motor disorders that affects the control of posture and movement and caused by birth injury, congenital

defects, and infectious disease (Hasan et al., 2023; Hossain et al., 2023). It is the commonest physical disability in childhood yet in many cases the cause remains unknown (Chakma et al., 2022). These disorders become manifest early in life and are permanent and non-progressive conditions (Reddihough and Collins, 2003; Alam et al., 2023, Mithun et al., 2023b). Bangladesh is one of the densely populated countries in the world. Disability is a major social and economic phenomenon in the country. In this country, disability is the most challenging issue (Islam et al., 2018;Islam et al., 2023; Kuddus et al., 2022). A child is born in family as the torch bearer, but when it is born with any disability then it bears curse for its family, even the parents are treated as the results of great sin. Now-a-days, this thinking has been changed enough is most of the countries of the developed world, but some developing countries like Bangladesh yet now is not enough aware of disability (Ahlin et al., 2012; Kuddus et al., 2020; Kuddus et al., 2021; Ferdous et al., 2023). In 1862,' when John little linked what was later called cerebral palsy to problems of labor and delivery, birth trauma was due to a prolonged, difficult labor related to cephalo-pelvic disproportion. Later, cerebral palsy was often caused by the trauma of forceps delivery used to save the life of the mother (John et al., 1988; Das et al., 2023; Sazzad et al., 2023). It is hypothesized that the causes of CP in developing countries are different from those in high resource countries, although this has to date not been investigated deeply. A recent study from Nigeria found that birth asphyxia (39.0%), bilirubin encephalopathy (24.4%) and post-infectious brain damage (18.3%) were the major causes of CP. Bangladesh is a densely populated country in South Asia with an estimated 2.6 million children living with severe disabilities but only 1500 children in the country have access to education in special schools sponsored by the Government. In a recent pilot study on the infectious causes of childhood disabilities, 859 children with severe physical impairment were identified from a rural sub-district (i.e., Shahjadpur) of Bangladesh of which 417 (48.5%) had CP (Khandaker et al., 2015; Sunny et al., 2020; Sunny et al., 2021a) Das et al., 2023). Recent evidence indicates that white matter brain lesions, often termed per ventricular leukomalacia (PVL), are the most important identifiable risk factors for the development of cerebral palsy (Alastair et al., 2015; Sunny et al., 2021b; Das et al., 2023). The hypothesis under examination is that inflammatory cytokines released during the course of intrauterine infection play a central role in the genesis of preterm parturition, fetal PVL, and cerebral palsy (Bo and Chan-Wook, 2003; Sunny et al., 2024). Although CP itself is not a progressive disease, its clinical expression may change over time as the brain matures. Despite advances in obstetrics and perinatology, the incidence of CP is reported to be approximately 2 per 1,000 live births (Moshe et al., 2017; Junichi et al., 2016). In Australia, CP occurring in approximately 2 to 2.5 per 1000 live births which is the main cause of physical disability in children (Armstrong and Stenson, 2007). In recent years, the prevalence of CP has been consistently expected at 2.0 to 2.5 cases per 1000 live births. These estimates turn into 15000 to 20000 children with CP in Canada and 150000 in the United States that the massive majority of whom are cared for at home by their parents and families (Bari et al., 2023). According to disability profile the Client assess in the ShishuBikash clinic (Rural center) during January to December 1998 showed a report of child disability where 42% of total disability was cerebral

palsy, among these spastic tetraplegia 19%, spastic diaplegia is and ataxic is 3%. From this statistics it is clearly seen that cerebral palsy has covered a large area in the field of cerebral palsy disability in Bangladesh (Tufael et al., 2023; Faruk et al., 2023). This study attempt to highlight some of the characteristics of cerebral palsy with a view to identify the contributing factors those are partially or wholly responsible for the condition in children by obtaining scientific information about the occurrence of miseries.

Materials and Methods

Study population and duration

The study was conducted with cerebral palsy patients at outdoor and indoor department of Bangladesh Council for Children Welfare (BCCW), Dhaka. The duration of the study was four months from September 2017 to December 2017.

Sample size

Sample size would be determined by calculating with the following equation

$$n = \frac{Z^2pq}{d^2}$$

Where, n= Desired sample size; Z= Standard normal deviate usually set at 1.96 which correspond to 95% confidence level; p= Proportion of the target population estimated to have a particular characteristics; q= (1- p); d= Degree of accuracy desire, usually set at 0.05%

Now required sample size was,

$$n = \frac{(1.96)^2 \text{ x } 0.27 \text{ x } 0.73}{(0.05)^2}$$

$= 302.87$

$= 302$

Where, Z= 1.96; p= 0.73%; q= (1-p) = 0.27%; d= 0.05%

According to this equation, the sample should be more than 300 people but due resource constrain the study was conducted with 100 patients attending at outdoor and indoor department of Bangladesh Council for Children Welfare (BCCW), Dhaka.

Experimental design

Quantitative research model was used in the form of retrospective type of descriptive survey in the design. Retrospective design is the most common survey approach to focus on the past as

well as present experience. Cross sectional study design was chosen because the aims of the study were to know Demography of cerebral palsy.

Sampling technique

Sample population was selected through purposive sampling technique from the study population considering the inclusion and exclusion criteria.

Data collection technique

All new consecutive patients who attended at outdoor and indoor department of Bangladesh Council for Children Welfare (BCCW) and were diagnosed as cerebral palsy were asked to parents to participate in the study as a case group and the parents of healthy child those who came here for health checkup. Data were collected by direct interviewing the questionnaire. A structured questionnaire was used for identifying the risk factors. This questionnaire has demographic criteria, maternal and fetal risk factors. This questionnaire was taken from Saadi, et al., (2012) their research. In that research the researchers identify the risk factors in their country by self-administered questionnaire. The researcher used their questionnaire as a reference. Also some questions were added in context of Bangladesh in according to do pilot study.

Data analysis

Data was analyzed by Microsoft Office Excel 2007 using a Statistical Package for Social Sciences (SPSS) software version 16. Data was represented by descriptive and inferential statistics.

Ethical consideration

Permission was taken from the Ethical Committee of University of South Asia (USA) and Bangladesh Council for Children Welfare (BCCW), Dhaka before starting the collection of data. Participants would allowed to withdraw themselves at any stage of the study.

Results

A cross sectional mixed method (both qualitative and quantitative) study was conducted at Bangladesh Council for Child of Disable and Center for the Rehabilitation of the Paralyzed to know the Cause of Cerebral Palsy. The Quantitative part of the result has been presented in the following tables and figures.

Table 1: Distribution of Cerebral Palsy Child by Age (n=100)

Age	Frequency	Percentage
1-4 years	52	52
5-8 years	42	42
9-12 years	6	6
Total	100	100

Among 100 CP child Approximately 52 (52%) Childs age were 1-4 Years, 42 (42%) Childs age were 5-8 years and 6 (6%) child's age were 9-12 years. The first group was the highest in number and percentage.

Table 2: Distribution of Cerebral Palsy Child by gender (n=100)

Gender	Frequency	Percent
Male	62	62
Female	38	38
Total	100	100

Among 100 CP child, approximately 62 (62%) Child were male and 38 (38%) child were female. The first group was the highest in number and percentile.

Table 3: Distribution of Mothers health condition of the Cerebral Palsy child (n=100)

Mothers health	Frequency	Percent
Good	77	77
Fair	20	20
Poor	3	3
Total	100	100

Table 3 shows that among 100 Mothers of CP child approximately 77% mother's health condition were good, 20% CP child mother's health condition were fair and only 3% mothers healthy condition were poor. The first group was the highest in percentage

Table 4: Distribution of fathers health condition of the Cerebral Palsy child (n=100)

Fathers Health	Frequency	Percent
Good	78	78.0
Fair	12	12.0
Poor	10	10.0
Total	100	100.0

Table 4 shows that among 100 Fathers of CP child approximately 78% Fathers health condition were good, 12% CP child Fathers health condition were fair and only 10% Fathers health condition were poor. The first group was the highest in percentage.

Table 5: Mothers educational level

Mothers education	Frequency	Percent
Primary	9	9.0
JSC Complete	26	26.0
SSC Complete	27	27.0
HSC Complete	28	28.0
Bachelor or above	10	10.0
Total	100	100.0

Table 5 shows that among 100 CP child mothers approximately 9% mother was primary education completed, 26% mother were JSC level education completed, 27% mother were SSC Completed, 28% mother were HSC level completed and 10 % mother were Bachelor degree completed. The fourth group was the highest in percentage.

Table 6: Fathers educational level

Fathers education	Frequency	Percent
Under primary	1	1.0
Primary complete	9	9.0
JSC completed	10	10.0
SSC completed	17	17.0
HSC completed	16	16.0
Bachelor or above	37	37.0
Total	100	100.0

Table 6 shows that among 100 CP child father approximately 1% father was under primary educational level completed, 9% father was primary education completed, 10% father were JSC level education completed, 27% father were SSC Completed, 16% father were HSC level completed and 37 % father were Bachelor degree completed. The fifth group was the highest in percentage.

Table 7: Mothers occupation

Mothers occupation	Frequency	Percent
Service holder	7	7.0
Housewife	93	93.0
Total	100	100.0

Table 7 shows that among the Mother of 100 CP child approximately 7% child's mother was service holder and 93% mothers were housewife. The second group was the highest in percentage.

Table 8: Number of child in participant's family

Number of child family	Frequency	Percent
1	44	44.0
2	34	34.0
3	18	18.0
4	3	3.0
5	1	1.0
Total	100	100.0

Table 8 shows that among 100 CP child approximately 44% Participants family child number was only 1, 34% participants has 2 child in his/ her family, 18% has 3 child's, 3% has 4 child's and only 1% participants has 5 child's in his/her family. The first group was highest in percentage.

Table 9: Sibling disability.

Sibling disability	Frequency	Percent
Yes	10	10.0
No	90	90.0
Total	100	100.0

Table 9 shows that among 100 CP child approximately 10% child's has sibling disability and 90% CP child has no sibling disability. The second group has the highest in percentage.

Table 10: Delivery History of CP Child.

Delivery history	Frequency	Percent
Normal delivery	60	60.0
Caesarean delivery	40	40.0
Total	100	100.0

Table 10 shows among 100 CP child approximately 60% CP child was delivered by Normal delivery process and 40% CP child was delivered by caesarean process. The first group was the highest i percentage.

Table 11: Birth history

Birth history	Frequency	Percent
Premature	54	54.0
Term	39	39.0
Post term	7	7.0
Total	100	100.0

Table 11 shows that among 100 CP child approximately 54% child was prematurely birth, 39% child birth was in term and 7% child was post term birth history. The first group was the highest in percentage.

Table 12: History of participant birth attendant

Birth attendant	Frequency	Percent
Doctor	40	40.0
Nurse	15	15.0
Midwife	20	20.0
Unprofessional	25	25.0
Total	100	100.0

Table 12 shows that among 100 CP child approximately 40% child birth attendant was doctor, 15% child's birth attendant was nurse, 20% child's birth attendant was midwife and 25% child's birth attendant was an unprofessional. The first group was the highest in percentage.

Table 13: Mothers pregnancy history

Mothers pregnancy history	Frequency	Percent
High blood pressure	19	19.0
Anaemia	14	14.0
Others illness	3	3.0
Fluid loss	12	12.0
Anaemia and fluid loss	1	1.0
Anemia	3	3.0
Nill	48	48.0
Total	100	100.0

Table 13 shows that among the mother of 100 CP child's approximately 19% mothers has high blood pressure during pregnancy, 14% mothers has anemia during pregnancy, 3% mothers has others illness during pregnancy, 12% mothers has lost fluid during pregnancy, 1% mothers has both anemia and fluid loss, 3% mothers has both anemia and other illness and 48% mothers has no complication during pregnancy. The last group was the highest in percentage.

Table 14: Labor duration of participant mothers during delivery.

Labor duration	Frequency	Percent
Prolong labor	45	45.0
Sudden labor	54	54.0
Total	1	1.0

Table 14 shows that among the mothers of 100 CP child approximately 45% mother's labor duration was prolong, 54% mother's labor duration was short and 1% mother's labor duration was sudden labor history. The second group was the highest in percentage.

Table 15: Birth injury of participant during birth

Birth injury	Frequency	Percent
Present	60	60.0
Absent	40	40.0
Total	100	100.0

Table 15 shows that among 100 CP child approximately 60% child has birth injury and 40% child had no birth injury during birth. The first group was the highest in percentage.

Table 16: History of participant birth asphyxia

Birth asphyxia	Frequency	Percent
Present	45	45.0
Absent	55	55.0
Total	100	100.0

Table 16 shows that among 100 CP child approximately 45% child has birth asphyxia and 40% child has no birth asphyxia during birth. The second group was the highest in percentage.

Table 17: Crying duration history after birth.

Minute cried	Frequency	Percent

Just after birth	40	40.0
5-30 minute	35	35.0
30 minute- 1 hour	12	12.0
More than 1 hour	13	13.0
Total	100	100.0

Table 17 shows that among 100 CP child approximately 40% child had cried just after birth, 35% child had cried after 5 to 30 minute after birth, 12% child had cried after 30 minute- 1 hour after birth and 13% child had cried after more than one hour of birth. The first group was the highest in percentage.

Table 18: Birth complication of the participant

After birth complication	Frequency	Percent
Jaundice	11	11.0
Dehydration	8	8.0
Pneumonia	7	7.0
Seizures	40	40.0
Others	1	1.0
Jaundice and pneumonia	3	3.0
Dehydration and seizure	4	4.0
Jaundice and seizure	7	7.0
Jaundice, pneumonia and seizure	1	1.0
Pneumonia and seizure	6	6.0
Nill	12	12.0
Total	100	100.0

Table 18 shows that among 100 CP child approximately 11% child has jaundice after birth, 8% has dehydration, 7% child has pneumonia, 40% child has Seizure, 1% child has others complication, 3% child has jaundice and pneumonia, 4% child has dehydration and seizure, 7% child has jaundice and seizure, 1% child has jaundice, pneumonia and seizure, 6% child has pneumonia and seizure and 12% child has no complication after birth.

Table 19: History of drug reaction after birth of the participant

Drug reaction after birth	Frequency	Percent
Yes	9	9.0
No	91	91.0
Total	100	100.0

Table 19 shows that among 100 CP child approximately 9% child has the history of drug reaction and 91% child has no history of drug reaction. The second group was the highest in percentage.

Table 20: Head injury of the participant after birth

After birth head injury	Frequency	Percent
Yes	60	60.0
No	40	40
Total	100	100.0

Table 20 shows that among 100 CP child approximately 60% child has the history of head injury after birth and 40% child has no history of head injury after birth. The first group was the highest in percentage.

Table 21: History of participant behavior

Child behavior	Frequency	Percent
Normal	60	60.0
Abnormal	40	40.0
Total	100	100.0

Table 21 shows that among 100 CP child approximately 60% child behavior was normal and 40 % child behavior was abnormal. The first group was the highest in percentage.

Table 22: Types of CP that are the participant suffering from

Types of CP	Frequency	Percent
Spastic CP	32	32.0
Ataxic CP	33	33.0
Athetoid CP	10	10.0
Mixed CP	25	25.0
Total	100	100.0

Table 22 shows that among 100 CP child approximately 32% child has spastic type of CP, 33% has ataxic types of CP, 10% child has athetoid types of CP and 25 % child has mixed CP. The second group was the highest in percentage.

Table 23: Communication skill

Communication skill	Frequency	Percent
Good	52	52.0
Poor	48	48.0
Total	100	100.0

Table 23 shows that among 100 CP child approximately 52% child communication skill was good and 48% child communication skill was poor. The first group was the highest in percentage.

Table 24: Mental retardation status of the participant

Mental retardation	Frequency	Percent
Yes	17	17.0
No	83	83.0
Total	100	100.0

Table 24 shows that among 100 CP child approximately 17% child was mentally retarded and 83% child was not mentally retarded. The second group was the highest in percentage.

Table 25: Treatment taken by the participant for CP

Treatment for CP	Frequency	Percent
Yes	93	93.0
No	7	7.0
Total	100	100.0

Table 25 shows that among 100 CP child approximately 93% child has taken treatment and 7% child had not taken treatment for CP. The first group was the highest in percentage.

Table 26: Types of treatment that are taken by the participant for CP

Types of treatment	Frequency	Percent
Medical management	4	4.0
Physiotherapy management	69	69.0
Both	27	27.0
Total	100	100.0

Table 26 shows that among 100 CP child approximately 4% child treatment was medical management, 695 treatmentswere physiotherapy and 27% child has taken both treatment. The second group was the highest in percentage.

Table 27: Prognosis after treatment.

Prognosis after treatment	Frequency	Percent
Good	30	30.0
Fair	43	43.0
Poor	27	27.0
Total	100	100.0

Table 27 shows that among 100 CP child approximately 30% child prognosis was good, 43% child's prognosis was fair and 27% child prognosis was poor after treatment. The second group was the highest in percentage.

Discussion

About 100 cerebral palsy children was participated in this study to know the cause of cerebral palsy among the children. Among them I found 62% male children and 38% female children. The age range of the children's were 1-4 years of 52% children's, 5-8 years of 42% children's and 9-12 years of 6% children's. The finding of this study was similar to another study which was conducted by LuziaIara at 2009. In this cross sectional study the family history that I have found are 77% cerebral palsy children's mothers' health condition was good, 20% children's mothers' health condition was fair and 3% children's mothers' health condition was poor. As well as 78% cerebral palsy children's fathers health condition was good, 12% children's fathers' health condition was fair and 105 children's fathers' health condition was poor. Parent's Educational level also was one of the family history. I have found 9% children's mother was primary education level completed, 26% mother was JSC completed, 27% mother was SSC completed, and 28% mother was bachelor degree completed. Fathers educational level as well as are 1% father was under primary level, 9% father was primary level completed, 10% father was JSC completed , 27% father was SSC completed, 16% father was HSC completed and 37% father was bachelor degree completed. I also found 7% mother of cerebral palsy children's were service holder and 93% mother were housewife. Number of children in cerebral palsy children family was another family history. I founded that 44% children have no another child in his/her family besides him, 34% children has 2 children in his family, 18% children has 3 children in his family, and 1 % children has 5 children in his family. Sibling disability is one of the most important risk factor for cerebral palsy and I found 10% children's sibling was disable and 90% children's sibling has no disability. The study was similar to another study which was carried out by Catherine et al., (2008).

Delivery History is most important factor and birth attendant is one of the most important factor in the cause of cerebral palsy. In this study I found that 55% cerebral palsy children's delivery was Normal delivery and 45% children's delivery was caesarian delivery. There was a history of birth attendant. Among the 100 Cerebral palsy children 30% children's birth attendant was a doctor, 20% children's birth attendant was nurse, 25% children's birth attendant was midwife and 25% children's birth attendant was an unprofessional. The findings of this history of this study was supported by another study which was carried out by Alastair et al., (2015)

Mother's history during pregnancy was taken for the study. After the study I found that, 19% mothers of cerebral palsy children has High blood pressure during pregnancy, 14% mothers has anemic, 3% mothers has others illness, 12 % mothers has lost fluid during pregnancy, 1% mothers has both anaemia and fluid loss, 3% mothers has anaemia and others illness and 48% mothers has no complication during pregnancy. The finding was likely similar to another study which was carried out by Morphy et al., (1995).

The study also found that 60% cerebral palsy children has birth injury and 40% children has no birth injury. A complete picture of birth complication was also founded from this study that are 11% cerebral palsy has jaundice, 8% children has dehydration, 7% children has pneumonia, 40% children has seizure, 1% children has others complication, 3% children's has both jaundice and pneumonia, 4% children's has both dehydration and seizure, 7% children's has both jaundice and seizure 1% children has jaundice, pneumonia and seizure ,6% children has pneumonia and seizure and 12% children has no complication after birth. The findings of these part of my study was similar to another study which was done by Junichi, (2016).

Study also founded that, 40% child had cried just after birth, 35% child had cried after 5-10 minute of birth, 12% child had cried after 30 minute-1 hour of birth and 13% child had cried after more than one hour of birth. Study also found that 60% children with cerebral palsy had head injury and 40% children had no head injury after birth. The study findings of this part was similar to the findings of a study which was carried out by Eunice and Onike, (2015).

Behavioral problem and communication problem among the cerebral palsy children is most common. In my study I have found 60% children's behavior normal and 40% cerebral children's behavior was abnormal. Among the children's with cerebral palsy 52% children's communication skill was good and 48% children's communication skill was poor. Study also found that 17% children with cerebral palsy was mentally retarded and 83% children was not mentally retarded. The findings of these characters' was similar to another study which was conducted by Suzanne et al., (1996).

Birth history is most significant. I have found in my study that 54% children with cerebral palsy was preterm baby, 39% was born in term and 7% children was born after term. Among the cerebral palsy children 45% children's mothers' labor duration was prolong during the birth of

child, 54% mother's labor duration was short and 1% mother's labor was sudden. The study was supported by another study of Eve, (2015).

Birth asphyxia is a common cause of cerebral palsy. In my study I have found that 45% child with cerebral palsy has birth asphyxias and 55% child had no birth asphyxia. The findings is similar to another study of Bo Jacobson. Among the cerebral palsy children study found that 32% children's cerebral palsy was spastic type, 33% was ataxic CP, 10% was athletic type of CP and 25% children s CP was mixed type. The study findings is similar with research findings of Pierre et al., (2006).

Conclusion

One of the most prevalent childhood disabilities that has an impact on kids' entire development is CP. Children diagnosed with cerebral palsy (CP) may exhibit mobility disorders, challenges with speech and language, hearing, and vision. In order to assess the prognosis and provide the parent with counseling, pre-planned questions are asked of parents when they obtain a case history about their children. According to this study, there is a strong correlation between cerebral palsy and the following risk factors: jaundice, neonatal convulsion, hypoxia at birth, hospital delivery, and birth injury. A few additional indicators, which are not statistically significant in this study, are also linked to cerebral palsy and include miscarriage, hospital birth, cousin marriage, maternal infection, maternal anemia, and mother hypertension. The fact that every case of cerebral palsy was expertly diagnosed by a physician, neurologist, or both lends credibility to the study. The availability and dependability of each patient's medical card and the hospital medical records presented a challenge to our research. This study, which was based on hypothetical circumstances, was a case control study. We would undoubtedly get more precise results from a cohort research with comparable goals in the future, particularly when it came to the temporal link between the risk variables and the outcome.

Recommendation

The results of the study compel medical professionals and legislators to recognize the need of providing adequate labor room facilities to avoid hypoxia during childbirth and to prioritize seizure treatment. As neonatal asphyxia and birth injury continue to be the main risk factors for cerebral palsy in Bangladesh, neonatal care services need to be reassessed and given more attention and support by governmental and nongovernmental groups. More funding should be set aside to improve Bangladesh's newborn care services if we are to address the country's cerebral palsy issue. Strong public health education on the causes and symptoms of cerebral palsy, with a focus on how it affects youngsters and can be very disabled. By taking their pregnant women to well-equipped medical facilities for delivery, people would become more conscious of the need to adopt appropriate preventive measures. Pregnant women should be informed about the nature of newborn jaundice in particular. Pregnant women should undergo routine and frequent

screening for infections. It's critical to diagnose and treat patients early. A larger sample size and more research should be required.

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