Maternal factors related to children with cerebral palsy

Mst. Rabea Begum, M S A Mansur Ahmed

ABSTRACT

Aims: To find out the socio-demographical and medical information of mothers, to determine the pregnancy related maternal factors relevant to cerebral palsy of children and to find out the association between sociodemographic characteristics with maternal factors related to children with cerebral palsy. **Method:** A descriptive cross-sectional study was conducted. Sampling was done to select 159 cases through interview by using semi-structured questionnaires. Statistical Package for the Social Sciences (SPSS) software was used to generate descriptive statistics and cross tabulations with chi-square test were performed to explore associations between variables. **Result:** Maternal age range 13–19 years and mean age was 20 years. Most of the respondents were mainly housewives. Total 62% of the respondent had cousin marriage. Mostly respondents were living in rural area (51%). Among the respondents 54% had secondary levels of education followed by primary & HSC completed level (11% each). Total 64% respondents had attended four or more antenatal visits. During pregnancy, history of rubella infection was found in 11%, hypertension in 12%, diabetes in 4%, convulsion in 10% and 30% of the respondents had history of anemia. Total 43% respondents had history of excess amniotic fluid loss before delivery and 38% respondents had fluid loss at 3rd trimester. History of trauma was present in 31% and history of fall down in 26%. There was significant association between maternal age and gestational diabetes (p<0.05); type of living area and history of trauma during pregnancy (p<0.05); educational level and number of taking antenatal visits (p<0.05); maternal age and number of antenatal visits (p<0.05). **Conclusion:** This study showed that cerebral palsy was more common in younger and older aged mothers. Cerebral palsy was associated with rural area and low number of antenatal visits. Maternal trauma was more common in rural and semi-urban area than urban area. Maternal education also positively influences utilization of antenatal visits. Maternal factors including gestational diabetes, hypertension, eclampsia, anemia, infection were not prominent factors of cerebral palsy. Socio demographic characteristics of children with CP were found important in this study.

Keywords: Cerebral palsy, Maternal factors, Risk factors

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INTRODUCTION

Cerebral palsy (CP) is the most common cause of severe physical disability in childhood. This is the most common neuromotor developmental disability in children affecting 8,000 to 12,000 children in the United State [1]. The worldwide prevalence of CP is approximately 2–2.5/1000 live births [2]. During the past 20 years, there has been

increase in the incidence and prevalence of cerebral palsy due to improved documentation of cases by increasing national registries, advances in management of neonatal care and other factors [3]. According to the United State census bureau, the total numbers of people with cerebral palsy in Bangladesh were 141,340,476 in 2004 [4].

Cerebral palsy describes a group of disorders of posture and movement that causes activity limitation and sometimes characterized by disturbances of sensation, cognition, communication, perception and/or behavior and/or by a seizure disorder [5]. Cerebral palsy results from an injury in the developing central nervous system that can happen in utero, during delivery, or during the first two years of life [6]. It is more common in males than females but the reason of this disparity is uncertain. It causes white matter injury and intra-ventricular hemorrhage [7].

Prenatal events are responsible for approximately 75%, perinatal for 10–15% and postnatal causes are 10% of all cases of CP [8]. Maternal factor is one of the most common factors among prenatal events for developing CP. Mothers who are above 40 years of age during pregnancy are more likely to give birth to a baby who has cerebral palsy. Also, younger age less than 20 years during pregnancy is also vulnerable [9]. A study indicated that maternal infection increases the risk of spastic cerebral palsy (CP) in term infants, whereas this association appears to be less evident in preterm infants [10].

Maternal hypertension in pregnancy, especially pre-eclampsia, is associated with increased perinatal mortality and morbidity. Gestational diabetes has a health risk both for the mother and child. Gestational diabetes places the fetus at greater risk of cerebral palsy [11].

Maternal hypertension and gestational diabetes are common in some percent of pregnancies that results in many complications that primarily affect the fetus, including macrosomia, stillbirth, jaundice, and pulmonary infections [12]. Gestational diabetes was found with lower risk of hypertension among those women who received more prenatal or antenatal care. Women with low prenatal care have increased risk of preeclampsia by 30 percent that is another factor of CP [13]. Low socioeconomic factors may also influence the risk of cerebral palsy [14]. Low standard of living in developing countries is common. Poor housing with crowed conditions is the feature of this type of living. Internationally, a higher incidence of cerebral palsy has been related to socio-economic factors [14].

Maternal trauma during pregnancy has been implicated as a factor of CP [15] and an epidemiological study has suggested that there is an association between maternal hypertension and CP [16] though the data is very old due to non-availablity of recent literature on this subject.

Infections in the mother, including rubella (German measles), cytomegalovirus (mild viral infection) and toxoplasmosis (mild parasitic infection) can cause brain damage and result in cerebral palsy. The maternal infections involving the placental membranes (chorioamnionitis) may contribute to cerebral palsy in full-term as well as preterm babies. A study suggested that chorioamnionitis is an independent risk factor for CP among term and near-term infants [17].

Having consanguineous parents is a known risk factor for congenital disability and genetic disorders [18]. A case control study found that consanguinity and birth deficits in family members were positively associated with cerebral palsy [19]. The prevalence of cerebral palsy (CP) is greater in twin pregnancies than in singleton pregnancies [20].

Cerebral palsy is a severe disability and a substantial burden for the affected individual's family and society [21]. The prevalence of disability is going to be high for reasons relating to over population, extreme poverty, illiteracy, lack of awareness and lack of proper medical care and services. Still in Bangladesh also there is very less reliable data on this issue and so far, limited research findings are available to explore the maternal factors related to cerebral palsy of children. After this study caregivers will be able to inform parents about the importance of antenatal care which will be reduce the maternal complication during pregnancy.

The specific objectives of this study were to find out the socio-demographical and medical information of mothers, to determine the pregnancy related maternal factors relevant to cerebral palsy of children and to find out the association among sociodemographic characteristics with maternal factors that are related to children with cerebral palsy.

MATERIALS AND METHODS

A cross sectional study was done at Pediatric Unit of Centre for the Rehabilitation of the Paralyzed (CRP), Savar, Dhaka. The majority of the cerebral palsy children were taking treatment. Mothers of children with cerebral palsy were the study population. Only mothers were selected as a caregiver for this study. For example, fathers and any other relative of children were not allowed. The participants who unwilling to participate, were excluded from this study. Total 159 subjects were selected according to the inclusion and exclusion criteria.

Ethical consideration

A written and verbal consent form was used during data collection. The research proposal was submitted to the ethical board of CRP. The researcher maintained the confidentiality and participants had equal rights to withdraw from this study at any time. The study followed the World Health Organization (WHO) and Bangladesh Medical and Research Council (BMRC) guideline.

Data collection and analysis

One data collector was recruited to collect data for this study. Data was collected through face to face

interview. A semi-structured questionnaire was used for data collection. After completing collection of data, these data were cleaned, edited, entered and analyzed by the software of Statistical Package of Social Science (SPSS) version 14th. The Chi square was done to analysis of data to detect statistically significant association. These findings were presented by using combination of tables, pie charts, cross tables etc.

RESULTS

The aim of this cross-sectional study was to find out the maternal factors related to children with cerebral palsy. A total of 159 participants were included in this study.

Sociodemographic information of the participants

The mean age of the participants was 20 years. Among the interviewed participants 51 percent were from rural, followed by 28 percent were from semi-urban and 21 percent were from urban area. Ninety five percent of the participants were housewife, 3.8% were service holder and 1.3% was daily laborer or garments worker. Total 2.5% of the respondents were illiterate or without education, 10.7% had primary education, 68.5% secondary level, higher secondary 10.7% and 7.5% had graduate educational qualification. The majority (40.3%) of the participant's economic status were currency of Bangladesh (BDT)<5000 and 39% belongs up to BDT 10000, 6.9% participants family income was BDT 11,000 to 15,000, 8.8% was BDT 16000–20000 and only 5% participant was above BDT 20,000. The mean income was BDT 10113.2. In this study 95% respondents were housewife. Only 3.8% respondents are service holder and 1.3% is worker. Total 62% of the respondents had no history of cousin marriage/consanguinity and 38% of the respondents had history of cousin marriage.

Medical information of the participants

The 6% participants had history of twin pregnancy of mothers. Among all participants 11.3% were affected by German measles. Total 73.6% of the participants had no history of hypertension. Only 12.6% had history of hypertension among all participants but 13.8% of the respondents didn't know about their hypertension status. The majority (81.8%) of the participants had no history of diabetes and only 3.8% had history of diabetes during pregnancy but 14.5% participants didn't know about their diabetic status. Total 10.1% of the participants had history of convulsion due to eclampsia, 30% participants had anemia during pregnancy, 43.4% participants had history of excess amniotic fluid loss during pregnancy, 43.4% participants had history of excess amniotic fluid loss and 38% had fluid loss at 3rd trimester during pregnancy. Total 31.4% participants had history of trauma during pregnancy, 26% participants had history of falling down and 2% had history of lifting heavy object, physical assault and others during pregnancy.

Table 1 shows that significant association was found between age and number taking antenatal visits and gestational diabetes, between education and antenatal visits and between type of living area and history of trauma. Association between maternal age and hypertension was not significant.

DISCUSSION

The purpose of this study was to find out the maternal factors related to children with cerebral palsy. It is necessary to find out the factors for planning and implementing for preventing and combating the diseases.

According to the information of the respondents, the common age groups for maternal age at 1st birth 13–19 years was 52.8%, 20–24 years was 34.6% and ≥25 years was 12.6%. The mean age of the respondent was 20 years. Here the maximum age was 33 years and minimum age was 13 years. It is known that cerebral palsy is more common in younger mother. A study was done on cerebral palsy of hispanic adolescent mothers (aged <18 years) and found that there was an increased risk of having a child with cerebral palsy [22] which is similar with this study.

In this study 51% of the respondents come from rural area, 28% from semi-urban area and 21% from urban area. The 40.3% of the participant's economic status were BDT <5000 and 39% had up to BDT 10000. A study was found that low family income and living in rural areas are

Table 1: Association between sociodemographic factors and maternal factors

Socio-demographic factors	Maternal factors	Chi-square (χ^2)	Probability value (p)
Age	Antenatal visit	3.41	0.037*
	Gestational diabetes	6.845	0.033*
	Hypertension	6.401	0.171
Education	Antenatal visit	25.256	0.047*
Living area	Trauma	9.868	0.007*

*Significant

associated with higher prevalence of cerebral palsy [23]. Prevalence of CP was higher in lower income families than middle- and upper-income families [24]. The causal pathways are underlying the relationship between lower educational class and cerebral palsy [25]. This study also found similar relationship among respondents who had completed secondary level of education (54.7%) and only 7.5% respondents had completed above HSC level of education. In this study it was shown that 1st child was affected in 67%. It has been observed in a study that babies who are first born could have greater chances of having cerebral palsy [9].

This study found that 62% respondents had no history of cousin marriage/consanguinity. Only 38% respondents had cousin marriage. In a study it was reported that consanguineous marriage was top-ranked risk factors in Turkish children with CP [26]. In this study researcher did not find that consanguineous marriage is prominent factor whereas evidence strongly suggested that there was a positive relation with CP. Another finding was in this study was 94% respondents have no history of twin pregnancy and only 6% has history of twin pregnancy. A study drew attention to the increased risk of cerebral palsy among twins than single pregnancy [27]. But the current study did not find that twin pregnancy plays as risk factors of CP.

From this study, it was seen that 64% of the respondent had taken four or more antenatal visit and only 16% respondent didn't take any antenatal visit. Significant association was found between educational level and number taking antenatal visits see (Table 1). Maternal education has been also shown to influence utilization of antenatal care (ANC). A study in Nepal demonstrated that women with higher education were more likely to utilize ANC than those with lower education [28]. Another study found similar results, in which authors demonstrated that both maternal and paternal education positively influence utilization of ANC [29]. Significant association was also found between maternal age and number taking antenatal visit. Age is one of the most important factors for pregnancy complications. A study conducted in Turkey demonstrated that teenage mothers were statistically less likely to use antenatal services [30]. However, in other studies teenage mothers were more likely to start utilizing ANC services earlier than their older counter parts [31].

According to this study, only about 4% of respondent has history of gestational diabetes and 12.6% had history of hypertension. Other study found that hypertension during pregnancy was detected as one of the strong risk factors for causing CP [26]. This study also found only 11% of the respondent has history of rubella infection during pregnancy. The current study did not find that gestational diabetes, hypertension, eclampsia, maternal anemia and infection were not prominent risk factors of CP though evidence supports on these factors for CP. This study also found 31% of the respondent has history of trauma and among them 26% of respondent's history was fall down during pregnancy. Maternal trauma during pregnancy has been implicated in the etiology of cerebral palsy [16].

Being a hospital-based study; findings of this study may not be generalized and it may not give the result for the whole country. This thus restricts the external validity of this study. This study was conducted in only one tertiary hospital. It did not include other hospitals from tertiary level. For this reason, the generalizability of the study may be restricted. Also, Participants were not randomly selected for interview. Interviewer selected participants who were available and interviewed them. These induce a potential source of selection bias. Sample size being convenient and small compared to sample size calculation, thus it does not indicate results of a representative sample population of interest.

CONCLUSION

This study showed that cerebral palsy was more common in younger and older aged mothers. It was associated with rural area and low number taking antenatal visits. Maternal trauma was more common in rural and semi-urban area than urban area. Maternal education also positively influenced utilization of antenatal visits. Maternal factors including gestational diabetes, hypertension, eclampsia, anemia, infection were not prominent factors of CP. Socio demographic characteristics of children with CP were found important in this study.

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Author Contributions

Mst. Rabea Begum – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

M S A Mansur Ahmed – Conception of the work, Design of the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Guarantor of Submission

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Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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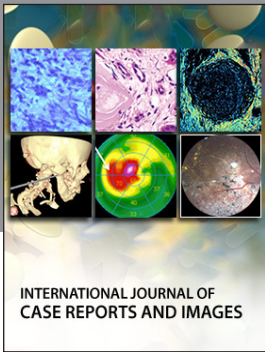
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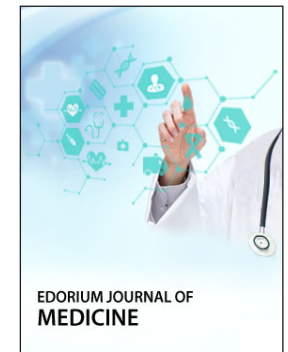HEPATOBILIARY AND
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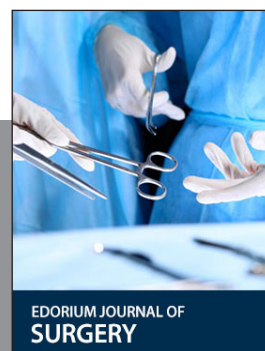DENTISTRY

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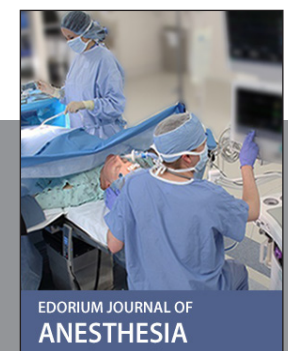IMAGES IN INFECTIOUS DISEASES

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