



# Maltreatment in multiple-birth children<sup>☆</sup>



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## ABSTRACT

**Objective:** The rate of multiple births has increased over the last two decades. In 1982, an increased frequency of injuries among this patient population was noted, but few studies have evaluated the increased incidence of maltreatment in twins. The study aim was to evaluate the features of all multiple-birth children with substantiated physical abuse and/or neglect over a four-year period at a major children's hospital.

**Study design and methods:** A Retrospective chart review was conducted of multiple-gestation children in which at least one child in the multiple set experienced child maltreatment from January 2006 to December 2009. Data regarding the child, injuries, family, and perpetrators were abstracted. We evaluated whether family and child characteristics were associated with maltreatment, and whether types of injuries were similar within multiple sets. For comparison, data from the same time period for single-birth maltreated children also were abstracted, including child age, gestational age at birth, and injury type.

**Results:** There were 19 sets of multiple births in which at least one child had abusive injuries and/or neglect. In 10 of 19 sets (53%), all multiples were found to have a form of maltreatment, and all children in these multiple sets shared at least one injury type. Parents lived together in 63% of cases. Fathers and mothers were the alleged perpetrator in 42% of the cases. Multiple-gestation-birth maltreated children were significantly more likely than single-birth maltreated children to have abdominal trauma (13% vs. 1%, respectively;  $p < .01$ ), fractures (83% vs. 39%;  $p < .01$ ), and to be injured at a younger mean age (12.8 months vs. 34.8 months;  $p < .01$ ).

**Conclusions:** Siblings of maltreated, multiple-gestation children often, but not always, were abused. In sets with two maltreated children, children usually shared the same modes of maltreatment. Multiples are significantly more likely than singletons to be younger and experience fractures and abdominal trauma. The findings support the current standard practice of evaluating all children in a multiple set when one is found to be abused or neglected.

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**Abbreviation:** CPS, Child Protective Services.

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## Introduction

Due to advances in perinatal and obstetric medicine, there has been an increase in the number of multiple live births in recent years. There were 23.3 multiple births per 1,000 live births in 1990 in the US; by 2008, this rate had risen to 34.1 per 1,000 births (U.S. Department of Health and Human Services, 2010). Previous studies have documented an increased rate of child maltreatment among families with multiple vs. singleton births, at 19% in families with twinning vs. 2% in singleton births (Groothuis et al., 1982; Nelson & Martin, 1985). More recently, twins were noted to have more abusive fractures than non-twin contacts of abused children (Lindberg et al., 2012). Nelson and Martin (1985) evaluated 10 sets of maltreated twins, and also found a higher frequency of abuse among twins, although this study did not compare types of maltreatment among the twins or perpetrators. Only two previous case reports have addressed injuries in multiples and circumstances surrounding their maltreatment (Becker, Liersch, Tautz, Schlueter, & Andler, 1998; Dhanani, Nield, & Ogershok, 2006). These two reports consist of a total of five sets of twins and their presentations and evaluations. Not enough is known, however, about maltreatment in multiple-gestation children. To our knowledge, no studies have examined perpetrator, family, or child characteristics associated with maltreatment of multiple-gestation children.

The goal of this study, therefore, was to evaluate the patterns of injuries within sets of multiples, and describe the child, alleged perpetrator, and family characteristics. The secondary aims were to identify any risk factors associated with maltreatment within multiple sets, in comparison with maltreated single-birth-gestation children.

## Methods

### Participants

Charts were reviewed and data abstracted for all children < 18 years old from multi-parity gestations who had substantiated maltreatment and had been evaluated by the child maltreatment team at Children's Medical Center Dallas from January 2006 to December 2009. A substantiated maltreatment case was determined by the multidisciplinary maltreatment team as a case with a high level of concern for physical abuse or neglect. The multidisciplinary team included child maltreatment physicians, social workers, and child protective-services workers. Selected data (child age, gestational age at birth, and injury type) on the comparison group of single-gestation-birth children were abstracted from the electronic medical record in the same fashion from the same time period.

### Materials and protocol

A retrospective chart review was performed using data from electronic and traditional medical records at Children's Medical Center Dallas and Parkland Memorial Hospital. The information contained in the medical charts included histories provided by caretakers, information from Child Protective Services, imaging studies, and assessments by medical personnel. Although the names of the patients were known initially during the chart abstraction, all identifying markers were subsequently removed and replaced with alternative identification numbers and letters.

Data abstracted from charts of maltreated multiple-birth children included the types of maltreatment, age at the time of injury, gestational age at birth, presence of developmental delay, pre-existing medical conditions, perceived fussiness by parents, race/ethnicity, and gender. Maltreatment findings were categorized as: fractures, intracranial hematomas, neglect, abdominal trauma, or cutaneous manifestations (including burns, bruising, and frenulum injuries). Neglect categories included failure to thrive and medical neglect. Fractures were further categorized as skull fractures, rib fractures, diaphyseal fractures, or metaphyseal fractures. Injuries which were deemed questionable on radiographs (i.e., concern for fracture without positive confirmation) were not classified as injuries.

Data regarding the type of maltreatment in single-birth children with substantiated maltreatment evaluated by the child maltreatment team during the same time period was abstracted in the same fashion for comparison. Substantiated maltreatment was defined by the child maltreatment team as injuries that were "highly concerning for" or "consistent with" non-accidental trauma. Any personal identifying markers were removed and replaced with alternative identification numbers and letters.

Family and alleged perpetrator data also were collected, and consisted of the parents' relationship (living together, separated but involved, or not involved), primary caretaker category, perpetrator category, parents' ages, and whether the perpetrator lived with the children. The alleged perpetrator was identified as the person with the child at the time of the injury, using law enforcement convictions and Child Protective Services investigation data.

We used Fisher's exact test to examine whether race/ethnicity, primary caretaker category, or the parents' relationship were associated with maltreatment of all children in a family. We used the rank-sum method to test whether the age of the mother, the age of the child, or gestational age were associated with maltreatment of all children in a family. In families in which at least one child was not maltreated, we used the Cochran-Mantel-Haenszel Chi-square test, stratified by family, to test whether the child's age, developmental delay, or perceived fussiness were associated with maltreatment. For each pair of children in the sample, we calculated the simple matching coefficient (the number of matched injury types divided by the number of comparisons) to examine the similarity of types of maltreatment found. We used the rank-sum method to test whether types of injury were more similar in children of the same family than in children of different families. The

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