



Risk factors and physical signs of child abuse in hospitalized children in Taiwan



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ABSTRACT

Purpose: This study used the Criteria for Distinguishing Abuse from Accidents Chinese version (CDAA-C) to determine cases of child abuse, undetermined intent, and unintentional injury, and compared risk factors and injury profiles among hospitalized children in Taiwan.

Design: A retrospective chart review study.

Methods: We selected children aged 0–3 who were hospitalized with a discharge diagnosis of injury or child maltreatment in a medical center in southern Taiwan between 2007 and 2009. The CDAA-C was used to collect children's demographics and injury types and to determine the intent of injury. Children's charts with records and notes of admission, surgery and emergency care were reviewed and analyzed.

Results: Among 157 eligible cases, the CDAA-C identified 13 child abuse cases including additional 8 victims who were not previously coded in ICD-9-CM. Most abused children suffered from brain injuries, had ≥ 2 in jury incidents, and had a misdiagnosis in the previous visit. Abused children were younger and more likely to be born premature.

Conclusions: This study highlighted the under-diagnosis of child abuse in Taiwan. An easy-to-use standardized screening tool for child abuse in Taiwan is needed.

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1. Introduction

Early identification and reporting of child abuse is crucial to prevent children from further harm. Since abusive caregivers rarely self-report to authorities, physicians and nurses who care for injured children carry the primary responsibility of identifying and reporting suspected abuse. However, failure and delays in diagnosis of child abuse are common. In a busy clinical setting, children's past hospital visits and subtle signs of child maltreatment are easily missed or ignored (Taitz, Moran, & O'Meara, 2004). In a chart review study of 258 children with abusive fractures, Ravichandiran et al. (2010) found that 52 (20.9%) abused children had one or more missed diagnoses of abuse at a previous physician visit. In this study, the median delay in recognition of child abuse was 8 days. Failures to diagnose child abuse may result in repeated injuries to the victim and can lead to catastrophic outcomes, including death of the child (Allareddy et al., 2014; Overpeck et al., 1999).

Victims of child abuse who are admitted to hospitals are often among the most severely injured children, so a hospital stay provides a prime opportunity for healthcare providers to identify abuse and prevent further injury. However, in Taiwan, underreporting of child abuse among healthcare providers is prevalent, despite a mandatory reporting law that has been in place since 1993 (Feng & Levine, 2005). The discrepancy between the 1.04% official report of child maltreatment in 2014 (Department of Statistics, Ministry of the Health and Welfare in Taiwan, 2015) and the 83% prevalence rate from self-reported data in a population-based study (Feng, Chang, Chang, Fetzer, & Wang, 2015) highlights the problem of severe underreporting. Reasons for failure to report include fear of stigmatizing the family, as well as lack of clear evidence to determine the intent of injury (Feng, Chen, Fetzer, Feng, & Lin, 2012).

Clinical differentiation of intentional and unintentional injury is difficult and complex. Factors related to delayed diagnosis or misdiagnosis of child abuse are multifactorial; they include hospital type (e.g., children's hospital versus general hospital), a clinician's personal characteristics, unclear description of the child's history, and lack of pathognomonic signs and symptoms.

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The differential diagnostic process for child abuse requires evaluating the type, location and severity of the injury, as well as assessment of risk factors and the child's history of injury. Previous studies have attempted to facilitate the diagnostic process by describing the characteristics of abused children and the pattern of their injuries (Avdimiretz, Phillips, & Bratu, 2012; Maguire, 2010). These authors provided evidence that the presence of multiple injuries or injuries at various stages of healing may indicate chronic child abuse. The developmental level and ability of a child also needs to be considered. In young children, traumatic brain injury and fractures are common indicators of intentional injury (Maguire, 2010; Trokel, Waddimba, Griffith, & Sege, 2006). Fractures of rib, humerus and femur are most commonly associated with child abuse; less consistent indicators were fractures of the tibia and radius/ulnar (Kemp, 2008; Pandya et al., 2009; Taitz et al., 2004).

Regrettably, the psychosocial risk factors for child abuse and unintentional injury are similar. These include male gender and young age, parents who are adolescent or single, and poverty (Baldwin, Pandya, Wolfgruber, Drummond, & Hosalkar, 2011; Klevens & Leeb, 2010; Pandya et al., 2009). Injury history can be more helpful, but caregiver histories are typically unreliable in the case of child abuse. Hence the clinician often needs to look for inconsistencies between objective data (the severity, site and types of injuries) and subjective data (medical history) in a medical evaluation of child abuse.

An easy-to-use screening tool could be very beneficial for clinicians to effectively diagnose child abuse. A systematic screen for child abuse may increase clinicians' awareness of child abuse and enhance their ability to make a correct diagnosis (Louwers, Affourtit, Moll, de Koning, & Korfage, 2010). The "Criteria for Distinguishing Abuse from Accidents (CDAA)" is a tool developed by Thomas, Rosenfield, Leventhal, and Markowitz (1991), the feasibility of which has been documented (Leventhal et al., 2007; Strait, Siegel, & Shapiro, 1995). Strait et al. (1995) studied 124 children under 3 years of age with humeral fractures, and used the CDAA to identify an additional 10 (8%) children as victims of child abuse who had previously gone undiagnosed, and another 23 (19%) as potential victims with inconclusive evidence of abuse.

Research on the medical diagnostic process and detection rate of child abuse in Taiwan is scant. Given the cultural context, in which family integrity is highly valued and child abuse is stigmatized, under-detection and -diagnosis of child abuse is likely prevalent in Taiwan. It is unknown whether introduction of a standardized screening tool, which could offer objective evidence to support clinicians' decisions to diagnose child abuse, would help physicians and nurses to more effectively and efficiently identify cases of intentional injury. The purpose of this study was to use the CDAA Chinese version to retrospectively examine a cohort of children in southern Taiwan who were hospitalized after incidents of injury over a two-year period. We used the tool to diagnose cases as child abuse, possible child abuse (undetermined intent), and unintentional injury, and compared risk factors and injury profiles among these groups.

2. Methods

We conducted a retrospective chart review of children aged 0–3 who were hospitalized in a medical center in southern Taiwan between 2007 and 2009. We selected children who had a primary or secondary discharge diagnosis of either injury or child maltreatment. Hospitalization due to injury was defined by the International Classification of Disease, Ninth Revision, Clinical Modification (ICD-9-CM) nature of injury codes (N-codes) and external cause of injury codes (E-codes). The N-codes used in this study included codes for fracture of skull (800–804.99), fractures of spine, ribs, clavicle, scapula, pelvis and long bones (i.e., humeri, ulnas, or femurs), dislocation and sprains (805–848), brain injury (850.0–854.19), injury to chest and organs, and open wounds (860–897), contusion, foreign body and burn (920.0–949.9), other injuries and trauma (950–959.9), and child abuse (995.50–995.59). Inclusion of the abuse codes was used to check the validity of the CDAA Chinese

version. E-codes of E800–999, used to describe the external cause of injury or poisoning and the intent and the circumstance of the event, were also included for review. Children with congenital bone disease, childhood cancer, and congenital heart disease were excluded from the analyses. Approval was obtained by the University Institutional Review Board, Taiwan (No. ER-99-204) before data collection. Children's charts with records and notes of admission, surgery and emergency care were reviewed and analyzed.

2.1. Tools

The "Criteria for Distinguishing Abuse from Accidents (CDAA)" (Thomas et al., 1991) was first translated into Chinese (called CDAA-Chinese). The CDAA-C consists of 28 items in 7 categories: definite child abuse (9 items), likely child abuse (4 items), questionable abuse (4 items), definite accident (3 items), likely accident (4 items), questionable accident (3 items), and unknown cause (1 item). Examples for each category were "positive skeletal survey-multiple recent fractures" for definite child abuse; "original doctors called injury abuse AND history inconsistent" for likely child abuse, "history consistent" for questionable abuse, "motor vehicle accident" for definite accident, "consistent story, no suspicion of abuse or neglect involved" for likely accident, "story somewhat inconsistent with extent of injury, social worker/physician no suspicion of abuse or neglect involved" for questionable accident, and "insufficient information available in charts" for unknown cause. An additional 37 questions were used to collect data on the child's age, gender, birth order, prematurity, developmental delay, past history of hospitalization or ED visits, number of past hospitalizations, diagnoses, types of the injury, and family structure (i.e., parent age, marital status, etc.). The psychometric properties of the CDAA-C were first established in a pilot study, using 24 charts and 2 raters (the principal investigator of this study and an advanced practice pediatric nurse with a specialty in child abuse). The CDAA-C had acceptable content validity (CVI = 0.8–1), and concurrent validity (Kappa = .611), and inter-rater reliability (Kappa = .77).

2.2. Data analysis

Descriptive statistics were used to describe children's demographics, diagnoses and injury patterns. Items (criteria) in different categories of the CDAA-C were used to group children into 3 categories: child abuse (i.e., positive skeletal survey – multiple recent fractures or fractures of various ages and physical findings.), unintentional injury (i.e., motor vehicle accident), and intent of injury unknown (insufficient information available in charts). For more details about criteria to distinguish child abuse from unintentional injury, please refer to (Thomas et al., 1991). Chi-square statistics were used to analyze the factors associated with these groups.

3. Results

Out of 247 sampled pediatric hospitalizations between 2007 and 2009, 157 children met the inclusion criteria. The CDAA-C found that among these 157 cases, 13 were classified as child abuse (8 "confirmed child abuse" and 5 "extremely likely to be child abuse") and 127 as unintentional injury (9 "confirmed accidental injury", 114 "highly likely to be accidental injury", and 4 "suspected accidental injury"). In 17 cases, intent was unknown. Cases in the unknown intent group were removed from analyses because essential information on children's diagnoses and maternal characteristics were missing. Five children who were previously diagnosed or coded as child abuse or shaken baby syndrome were included in the "child abuse" group by the CDAA-C. And 8 others were newly diagnosed. Table 1 describes children's characteristics between the two groups.

Children in the abused group had a mean age of 12 months ($SD = 13.86$) and were significantly younger than children in the group with

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