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CHILD ABUSE
CLINICAL INVESTIGATION MANAGEMENT AND NURSING APPROACH

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ABSTRACT

The overall aim of this thesis is to describe how children suspected of being abused were taken care of in a large Children's University hospital. Did the medical staff clinically investigate possible child abuse when this would have been appropriate and what was documented in the child's medical record? The secondary aim was to assess whether the medical staff followed the national legislation and reported suspected child abuse to the social services and finally to describe what the nursing staff experienced in their clinical encounters with children suspected of being victims of child abuse.

Study I

Aim: To evaluate clinical investigations for suspected child abuse in infants presenting to a Paediatric Emergency Department (ED) with certain primary complaints known to be associated with child abuse.

Methods: All medical records of emergency department admissions that included at least one of the selected primary complaints and a record of a CT head scan having been performed were located in the hospital database. Each medical record was reviewed and any documented discussion or clinical investigation of potential abuse was recorded. The images of each CT- scan were reviewed and re-evaluated for findings of any injuries attributable to AHI. Forty seven medical records satisfied our inclusion criteria. .

Results: Eighty seven percent of the 47 children had a head injury as the initial diagnosis. Thirty eight percent of the children belonged to the age group 0-3 months. Of the children admitted to the ED due to a head injury, twenty two children (54%) had a history deemed, in our retrospective review, to be suspicious for abuse while only one child had indeed been properly investigated for possible child abuse.

Conclusion: In this study we found that, despite good reasons, only a small number of investigations of suspected child abuse were carried out in the Children's hospital. The review showed that hospital staff had difficulties in properly recording whether there were any signs suspicious of child abuse.

Study II

Aim: To identify children diagnosed as victims of child abuse in a large Children's University hospital during the four-year period of 2005-2008, with focus on whether reports to social services were done as required and what follow-up was planned.

Methods: We studied retrospectively, during a four-year period (January 1, 2005 – December 31, 2008), all medical records of children assigned an ICD 10 code appropriate for child neglect /or child abuse

Results: We found 137 children diagnosed as victims of child abuse, out of which 42 (mean age = 6 years) were abused sexually while 95 where (mean age = 10 years) physically abused. According to the medical records, the medical staff reported only 55% of these cases to the social services. A report to the police was filed in 27%. A majority of the reports to police were filed prior to the hospital admission.

Conclusion: Only very few children admitted to the emergency department were diagnosed as victims of child abuse. Even though it is required by law in Sweden to report suspected child abuse or neglect to the Social services, we found that such reporting was documented in the medical records for only 62% of the sexually abused and 51% of the physically abused children. Efforts to improve knowledge of signs of child abuse is essential, as are intensified education concerning the laws requiring medical staff to report suspected child abuse and the proper procedures for such reporting.

Study III

Aim: The aim of this study is to identify infants and children below 2 years of age who may have been physically abused by searching the medical records for reports of CT brain scans that include descriptions of skull and brain injuries that should be suspected for AHI and of being caused by abuse. We then studied the primary complaints and management of these children.

Methods: The study group was identified using the computerized medical records database in the Children's University Hospital. All medical records (n = 1925), relating to a period of 8 years, including a report of a CT head scan were, recovered from the database and included in the study. All CT head scan reports were reviewed and we selected only those in which an intracranial haemorrhage was described. All the remaining 186 CT scans were recovered and reviewed by a paediatric neuroradiologist and an assessment was made whether the medical records included an adequate history that explained the haemorrhage, e.g. tumour, motor vehicle accident, ECMO, etc., and child abuse could be excluded with reasonable certainty.

Results: The most common reason for admission to the hospital ED was a fall from a low height (n=28) followed by the infant being dropped on to the floor by a caregiver (n=23) and a variety of medical reasons such as seizures, gastro-intestinal problems, unconsciousness or death (n=13). If the child was admitted to the ED for a medical reason, vomiting was the most common primary complaint (n=4, 31%). Four children attended the emergency department due to multiple traumas. In 22/68 children (32%) the hospital staff filed a report to the social services. The neuroradiologist suggested child abuse as a possible explanation for the findings on the CT scan in 28 (41%) children. Of this subgroup 61 % (n=17) were investigated for child abuse (including 12 children that also underwent an ophthalmological examination), and 15 (54%) of these children were reported to the social services.

Conclusion: In our study we could confirm that the findings on neuroradiology of skull fractures and intracranial haemorrhages were of the same type as previously reported in the literature in abused children.

We also found that the neuroradiologist's report is an indispensable part of the clinical investigation of possible child abuse. A mere description of the findings is not so useful, it is the opinion expressed by the neuroradiologist that the findings should lead to a further investigation of possible child abuse, that is important. Thus communication and cooperation around the injured child between clinicians with different specialties is most important for successful clinical management and final medical diagnosis. These conditions can only exist if the neuroradiologist has the skill and knowledge to detect, describe and understand the importance of the findings and clearly communicate this to the clinician in charge of the patient.

Study IV

Aim: The aim of this study was to identify nurse's experiences in the clinical care of victims of child abuse. The objective was to assess how nurses could remain professional especially when the suspected perpetrator is a parent.

Methods: Investigators used a qualitative design with a critical incident technique. Eleven nurses who cared for abused children and their parents in a tertiary care University children's hospital were interviewed.

Results: We highlighted three areas in the analysis of the interviews: Feelings of ambivalence, nurse's professionalism and the nurse's care strategies. The subjects expressed difficulties in maintaining a professional role in clinical encounters with the

parents. The nurses experienced conflicts in their roles to deal with being both a police (a judicial function) and a nurse (a caring function).

Conclusions: The nurses expressed that they had devised strategies to remain professional in the clinical encounter with abused children and their parents. To remain professional, education, counselling and experience was essential.

LIST OF PUBLICATIONS

I. Evaluation of documentation in potential abusive head injury of infants in a Paediatric Emergency Department. Tingberg B, Falk A-C, Flodmark O, Ygge B-M. Acta Pædiatrica 2009; 98: 777–781.

II. Children diagnosed as abused - A retrospective study of reporting to the social services and the police. Tingberg B, Martin H, Ygge B-M.
Submitted

III. Neuroradiology of intracranial haemorrhage and associated findings in children younger than 2 years who may be victims of child abuse. Tingberg B, Falk A-C, Flodmark O, Ygge B-M
In manuscript

IV. Nurses' experience in clinical encounters with children experiencing abuse and their parents. Tingberg B, Bredlöv B, Ygge B-M. Journal of Clinical Nursing 2008; 17:2718-2724.

CONTENTS

LIST OF ABBREVIATIONS

AHI	Abusive Head Injury
CIT	Critical Incident Technique
CRC	Convention of the rights of the child
CT scan	Computerized Tomography
EACH	European Associations for Children in Hospital
ECMO	Extra corporal membrane oxygenation
EHD	Epidural Haematoma
ED	Emergency Department
ER	Emergency Room
ICD-10	International classification of diseases, 10th revision
MRI	Magnetic Resonance Imaging
NOBAB	Nordic Association for Sick Children's Needs
RN	Registered Nurse
SDH	Subdural Haemorrhage
UN	United Nations

1 INTRODUCTION

The past few years we have seen how search lights in our society have been increasingly trained on child abuse [1]. Since the 1960's there has been an impressive flow of literature on the subject of child abuse from the disciplines of mental health, medicine and the law. Through the decades, several definitions of child abuse have evolved, with different disciplines favoring different emphases [2]. The definition used for child abuse in this thesis was the definition that the Swedish parliamentary committee proposed in 2001: "Child abuse is when an adult: subjects a child to physical or psychological violence, sexual assault, humiliating treatment or fails to meet the child's basic needs" [3]. Child abuse in all its many forms is one of the most challenging areas of medical practice. The cornerstone of all medical practice is the initial consultation with an individual who is ill or perceives himself to be so. In paediatric practice this is, by necessity, a third part consultation with parents or caregivers speaking for the child. An accurate history followed by clinical examination and necessary further investigations gives the best chance of arriving at a correct diagnosis followed by a management and treatment plan [1].

Child protection should be everyone's responsibility. Sweden has a law making it mandatory for all health care professionals (as well as all staff in organisations working with children including staff in detention centres to report all suspected cases of child abuse and neglect to the social services [4] Although all health care professionals have this legal responsibility, paediatricians and radiologists have a particular responsibility to ensure child safety when there are concerns that a child may have suffered significant harm [5]. It is well known that many children are abused or neglected but their plight does not get to the attention of the authorities [6-12].

2 GENERAL BACKGROUND

2.1. CHILDREN'S PERSPECTIVE

For health professionals to have a child's perspective means that when we, meet children, from the time of infancy to adolescence, we must try to see with their eyes, feel with their senses and try to read their thoughts [13]. This means that we, as health professionals, have an obligation to act as an agent for the child, to have empathy.

In the middle Ages, there existed no concepts such as childhood, youth and upbringing. Children "did not exist", but they were regarded as small adults and were expected to start working as soon as possible. Roughly, children still live under similar circumstances in large parts of the world [14]. The perception of the children changed significantly during the 1900's. It became more and more common not seeing them as their parents' property. Childhood began to be viewed as a crucial period in human life. Gradually, children emerged as individuals. Values such as parents should not beat their children, but treat them with respect, were spread in Scandinavia [15]. In 1989, the United Nations Children's Convention formulated for the first time children's human rights in a binding contract [16]. The UN Convention on the rights of the Child (CRC) states that all children have equal rights and equal value. No one shall be discriminated because of race, colour, sex, religion or language. Children's best interests always come first, and this must be adhered to by all [16].

Nordic Association for Sick Children's Needs, NOBAB [17], sees the use of standards for children and young people in health care as a tool to ensure and monitor quality of care when children are ill and/or hospitalized. This standard is prepared in accordance with the CRC and has existed since 1988. The NOBAB standard is in line with the Associations for Children in Hospital (EACH) chart, a tool to monitor the quality of child care in the 16 European countries that have joined EACH [17].

2.2 THE UN CONVENTION OF THE RIGHTS OF CHILDREN

The Convention on the Rights of the Child (CRC) is the first legally binding international instrument to incorporate the full range of human rights- civil, cultural,

economic, political and social rights. In 1989, world leaders decided that children needed a special convention just for them because people under 18 years old often need special care and protection that adults do not. The world leaders also wanted to make sure that the world recognized that children also have human rights [18]. The Convention sets out these rights in 54 articles and two Optional Protocols. It spells out the basic human rights that children everywhere have: the right to survival; to develop to the fullest; to protection from harmful influences, abuse and exploitation; and to participate fully in family, cultural and social life. The four core principles of the Convention are non-discrimination; devotion to the best interests of the child; the right to life, survival and development; and respect for the views of the child. Every right spelled out in the Convention is inherent to the human dignity and harmonious development of every child. The Convention protects children's rights by setting standards in health care; education; and legal, civil and social services [18]. The UN convention on the Rights of Children, which Sweden has signed, states that all decisions about children should be based on an assessment of what is best for the child [19]. This compilation and clarification of children's human rights sets out the necessary environment and means to enable every human being to develop to their full potential. The articles of the Convention, in addition to laying the fundamental principles from which all rights must be achieved, call for the provision of specific resources, skills and contributions necessary to ensure the survival and development of children to their maximum capability. The articles also require the creation of means to protect children from neglect, exploitation and abuse [18]. Abuse of children by their parents or other caregivers is a major health problem in high-income countries [9]. And it is also a violation of children's human rights [10].

2.3 THE SOCIAL SERVICES ACT

Sweden has a law making reporting mandatory when child abuse or neglect is suspected. Professionals with this task of mandatory reporting include health care providers and facilities, mental health care staff, teachers and other school staff, police officers and day care staff [4]. The Swedish legislation obligates all professionals in the health care system, working in private or public institutions alike, to report to the social authorities even on suspicion of child abuse. The Social Services Act enacted on 1 January 1982 states that anyone included in the groups above who suspects that a child

needs the protection that the Social Welfare Committee can provide must report this to the Social Welfare Committee.

In Stockholm County in 2009, 41% of the reports filed of suspected abuse/neglect to the social services were from the police, followed by the school (14%) and the social services (15%) [20]. Too few reports from the child healthcare system were filed to get adequate statistics. Doctors under-report abused children to the social services [21] and several reports has stated that doctors in general contribute a very small number of reports to the social services [22-24]. Macmillan [10] and others report in their studies about difficulties in the large group of children that are under-reported to the child protecting services and never receive attention of the authorities [7, 10]. Reasons for this under-reporting are lack of knowledge, unawareness of the signs of child abuse and ignorance of the processes for reporting to the social services. Another reason is a perception that reporting might do more harm than good [9]. In a report from the United Kingdom [9] it was found that only one in 30 children, who were physically abused by their parents, was investigated by the social services. Common beliefs that the social services do not act on the reported problem, can influence the reporting rates as well [9]. A Swedish study Corozza and colleagues [25] reported that only 51% of the reports to the social services were investigated further and that some kind of interventions was undertaken in 32% of these investigated cases.

2.4. THE LAW AGAINST CORPORAL PUNISHMENT, "ANTI-SPANKING LAW"

Presently in 2010, 25 countries in the world have legally banned corporal punishment of children at home, at school, in welfare institutions or in places of detention. This means that children living in the remaining 170 states worldwide are not legally protected against the violation of their physical and psychological integrity [26]. The law that prohibited corporal punishment was adopted by the Swedish parliament on 1 July 1979. The law states that children should not be subjected to corporal punishment or other humiliating treatment (Chapter 6, Section 1 of the Swedish Code on Parents and Children) [3]. The number of children exposed for corporal punishment has decreased since the law was introduced [27]. However, in a survey, by Janson et al [27], the decreasing trend has faded out. In this survey Janson and colleagues present that some groups in the society are more positive to corporal punishment such as males,

parents born in other countries than Sweden and parents that have been victims of corporal punishment themselves [27].

2.5. CHILD ABUSE – DEFINITIONS

Child abuse can be defined as "ill-treatment (that results in) actual or potential harm to the child's health, survival, development, or dignity in the context of a relationship of responsibility, trust or power" [28] (p.9). Maltreatment is an umbrella term used to encompass all forms of intentional harm to children by caretakers. Neglect includes lack of basic necessities and lack of supervision. It also includes medical and educational deprivation [29, 30]. Emotional abuse on the part of the adult causes psychological damage in the child. Physical abuse includes damage to the skeleton and to internal organs. Sexual assault is any inappropriate contact with or exposure to genitalia or other "private" parts of the body. Homicide ranges from slow death by starvation, paediatric condition falsification, and poisoning, to battered child syndrome and impulsive murder [30, 31]. The definition used for child abuse, in this thesis, was the definition that the Swedish parliamentary committee proposed in 2001:
"Child abuse is when an adult: subjects a child to physical or psychological violence, sexual assault, humiliating treatment or fails to meet the child's basic needs" [3].

2.6. CHILD ABUSE - STATISTICS

The annual number of deaths from maltreatment among children under the age of 15 years in Sweden is 0.6 per 100 000 children over a five year period [32]. Almost 3500 children under the age of 15 die from maltreatment every year in the industrialized world. On average, two children die from maltreatment every week in Germany and UK, three a week in France, four a week in Japan and 27 a week in the USA [32]. The true numbers of non-fatal incidents of maltreatment are difficult to estimate, the statisticians talk about "the maltreatment iceberg". In an Australian survey of child abuse 150 substantiated cases of physical abuse were found for every one death [32]. The true incident of non-accidental injury is unknown, and it is impossible to estimate what proportion of children attending an emergency department are, in fact, victims of child abuse [33]. It is rare that a parent or caregiver admits to the abuse, and there are rarely any witnesses [34, 35].

In a study by Helpérin et al, [36] 1116 adolescents aged 13-17 years answered a questionnaire. There were 192 (33,8%) girls and 60 (10,9%) boys who reported having experienced at least one occasion of sexual abuse. The experience of being a victim of sexual abuse is reported more often by females than by males [36, 37]. The age difference between the victim and the offender was in Priebe & Svedin's study [37] less than five years in 37.2 percent of all reported cases of sexual abuse. In this latter study 4339 Swedish high school seniors (grade 10-12) answered a questionnaire about lifetime prevalence and important characteristics of self-reported child sexual abuse. In the same study most reported perpetrator were not family members or a relative. More than one perpetrator was reported in 9,1 percent of the cases [37]. Two new retrospective studies conducted by Bahali and colleagues [38] and Perdahli Fis and colleagues [39] from Turkey could present socio-demographic characteristics that were consistent with the results of Priebe´s [37] and Halpérin's [36] in their studies.

2.7. ABUSIVE HEAD INJURY

The incidence of abusive head injury (AHI) in infants varies in different studies, from 17/100 000 to 40/100 000 [40-43]. The variation in the reported incidence depends on different study designs and different inclusion criteria. The reported incidence was higher in large cities [40] and when the study had a prospective design [42]. According to a national register in Sweden (for the years 1997–2001), approximately 1295 children (0–17 years) were assigned the diagnosis of abuse, and 36 children died due to child abuse or neglect [44]. An investigation concerning head injury during childhood was performed at the Children's University Hospital in Stockholm [45]. The study showed that 3168 children were admitted to the paediatric emergency department (ED) for head injury in one year. Of these children, 880 (22%) were younger than 18 months. As many as 80% of these children gave a history of a short fall (<1 metre) as the cause of injury. The high frequency of such accidents is alarming [45] bearing in mind that according to studies 64% of all head injuries with complicated skull fracture were due to AHI [41]. It is also well known that head injury is the most frequent cause of death in abused infants [41, 46]. In cases of AHI the infant may come to medical attention as a result of various symptoms such as irritability, poor feeding, lethargy, seizures, apnoea, head injury or unresponsiveness [46-50]. It is often but not always violent shaking with rapid accelerations and decelerations that causes the bridging veins to rupture and the brain tissue to be torn. This is seen in AHI, as characteristic subdural haemorrhages and

damage to the infant's brain [47, 50, 51]. A study by Hymel and colleagues [52] showed that infants and young children who demonstrated visible subcortical injuries, that were unrelated to motor vehicle accidents, require thorough evaluation for possible abuse. The CT-scan [53-55] is the single most important and readily available tool for detection of intracranial injury (e.g. possible abusive injuries). It is therefore recommended that a low clinical threshold for performing neuro-imaging is adopted in investigations of potential child abuse [53-56]. Another important marker for AHI is retinal haemorrhages; approximately 84% of children with AHI have retinal haemorrhages [47, 57]. Nevertheless, Thackeray and colleagues [58] showed in their study that looking for retinal haemorrhages has no value as a single investigation. Lack of retinal haemorrhages cannot be taken as a reason not to continue the full clinical investigation, with neuroradiological studies to confirm possible child abuse. [58].

The sequel and outcome from AHI cover a spectrum ranging from no symptoms to death. Approximately one in five patients exhibit little or no adverse effects of the abuse while 60% suffer significant injury and exhibit neurological symptoms, severe motor dysfunction, mental retardation or blindness and one in five die [47, 48, 50, 59]. There are some known risk factors associated with an increased risk of AHI [34]. Such risk factors may prove useful and should be considered by the health professional in his/her daily work and include: frustration experienced by the parent, young and single parents, previous history of child abuse, preterm birth, twins and infants with intrinsic behaviour patterns (e.g. inconsolable crying) [34, 48]. Parental risk factors such as abuse of alcohol or drugs and previous social service intervention within the family must also be considered [1]. Other important indicators of child abuse include: changing explanations given as the cause of the accident or injury, a delay in seeking treatment [50] as well as the medical history given by the parent being inconsistent with the clinical findings in the infant [60]. An infant presenting with a head injury and who is having a combination of risk factors is particularly likely to have been abused [1]. Nevertheless, the clinical situation in which the paediatrician finds himself is very difficult. The history presented by the caregiver/parent is by definition false or at least incomplete and the clinical examination is often normal or at least non-conclusive. It is in this situation extremely important that investigation is continued by neuroradiological, if appropriate, also a radiological examination, and an ophthalmological consultation including fundoscopy.

2.8 NEURORADIOLOGY

The detection of intracranial haemorrhage, particularly in the subdural space, and brain injuries require neuroradiological imaging. Three imaging methods can be used in investigation of the infant's head and brain. The least invasive method is cranial ultrasound which can be performed crib side and does not involve any ionizing radiation. The most common finding in abusive head injury is an extra cerebral haemorrhage in the subdural space [47, 50-52]. Such a haemorrhage is most commonly seen over the cerebral hemispheres, in the posterior fossa and in the interhemispheric fissure. The subdural space over the hemispheres is, together with the posterior fossa, the areas of the brain that are most difficult to visualize using standard technique for cranial ultrasound [61]. Hence an ultrasound study that shows evidence of increased or abnormal fluid in the extra cerebral space must be followed by further neuroradiological imaging to fully delineate all components of the haemorrhage or haemorrhages as well as identify or exclude associated brain injuries [62].

The purpose of imaging in suspected child abuse is not only to show injuries and haemorrhages but it is equally and often more important to exclude with certainty such findings. This is not possible with standard technique cranial ultrasound [63]. Hence cranial ultrasound has a very limited use in suspected child abuse as it cannot be used to exclude injury [63]. The role of ultrasound is therefore limited to specific indications such as looking for tears deep in the brain tissue, lesions that are reported to be seen by ultrasound [62].

The most commonly used imaging modality in suspected abusive head injury is computed tomography (CT) of the skull and brain [5]. CT-scanning, without the use of intravenous contrast material, is readily available and can be performed fast. With the use of modern equipment, sedation or general anaesthesia is rarely necessary. Routine CT-scanning is capable of showing all lesions associated with abusive head injury. Fractures are also depicted with CT-scanning although plain film X-rays may be necessary as a compliment to show all aspects of a skull fracture [61]. The extra cerebral fluid collections and haemorrhages are well seen. Any brain injuries such as contusions with or without haemorrhage and brain oedema are readily detectable and possible to quantify [61].

The attenuation of a haemorrhage on CT-scanning is in great parts related to the time that has lapsed since the bleed. However, the location of the haemorrhage, intraparenchymal, subarachnoid, subdural or epidural will have consequences for access of oxygen which also has a profound impact on the rate of decay of haemoglobin, the substance responsible for attenuating the X-ray beam in a haematoma. For similar reasons, a large haematoma will take longer to achieve a low attenuation that a small bleed. This decay in attenuation is well studied in some types of bleeds and is used daily by the neuroradiologists to assess the age of a subdural haemorrhage. The time course of decreasing attenuation of a subdural haematoma is studied in adults [64] and in children [65]. Using this information it is possible to estimate, within limits of the method, the age of a subdural haemorrhage by giving a "window" in time during which the haemorrhage likely occurred. This feature may be less important in the clinical context but is very important in the judicial process that follows when child abuse is suspected. It is important not to forget that it is the responsibility of the medical profession to perform the work-up of a case of suspected child abuse in such a manner that information from laboratory tests and radiological investigations is of such quality and nature that it becomes useful also as a piece of firm evidence in the forensic medical context [66].

CT-scanning involves X-rays or ionizing radiation. It has been proposed that the use CT in the investigation of the infant's brain may be harmful to the child and should be avoided [67]. However, the study of Hall et al has calculated a theoretical risk based on their retrospective study of the cognitive capabilities of children treated with local γ-radiation for skin haemangioma and concluded that the dose of γ-radiation associated with a common CT-head scan could have the same negative effect as local radiation in the 1930-ties. Similar studies of children imaged with CT-scanning do not exist. Assuming that this low risk does exist it must be compared to and balanced against the risk of not detecting evidence of abusive head injury and thus not being able to confirm that the child is a victim of child abuse [68]. Missing the diagnosis of child abuse has been shown to be very dangerous to the child as most perpetrators abuse the same infant repeatedly and the infant remains in mortal danger if it is not immediately removed from the abusive environment [46].

Magnetic Resonance imaging (MRI) is a newer neuro imaging modality which is using a strong magnetic field and electromagnetic fields to produce images of the body. It is

in general a modality with is very sensitive but less specific that CT-scanning and is an imaging method that is used in combination with other modalities and has certainly not replaced CT-scanning. Multiple imaging sequences are needed for each investigation and this is time consuming. Hence infants and children are rarely possible to study with MRI without heavy sedation or general anaesthesia, thus adding a certain but low risk to the procedure. MRI-scanning does not utilize ionizing radiation and is thought to be harmless. This is a major advantage, particularly in the paediatric patient. An EU-directive [69] makes strong recommendations that ionizing radiation should be avoided for medical use and a consequence of this is that MRI should replace CT and other x-ray techniques whenever possible. MRI is superior to CT-scanning in detecting old haemorrhages and abnormalities can be detected much later following a brain injury. This is a distinct advantage in investigating children who may have been victims of abuse. However, there is a major and very important limitation when MRI is used in this patient group. Establishing the age of a subdural haemorrhage in particular is a very important component of the clinical work-up in suspected abusive head injury. When MRI was introduced many publications claimed, and most textbooks still claim, that MRI could accurately date all haematomas based on the deoxygenation of haemoglobin. However, at least two studies have shown that estimation of age of a subdural haematoma [66, 70] or of an intra cerebral haematoma [71] is not reliable when using MRI-scanning. Although MRI-scanning fulfils all requirements for safe and reliable imaging modality in the clinical context of suspected abuse of an infant, the forensic perspective is not satisfied and MRI must not be the only modality to be used to estimate the age of a haematoma, being it extra- or intra axial in the head. It is therefore recommended that CT-scanning is used in the acute situation and that MRI is used for follow up imaging in the sub acute stage and later follow-up, or if CT is negative but the clinical suspicion remains strong [5].

In such rare cases when MRI may be the first line of investigation, this is of course excellent from a radiation protection point of view when the study is negative and haemorrhages and brain injury can be excluded. However, if the MR study is positive, it is mandatory to perform a CT scan immediately in order not to miss the very useful and forensically important information about the age of a haematoma.

2.9. ICD 10 CODES

The International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) is a system published by the World Health Organization (WHO) and is used to code diseases, signs and symptoms, abnormal findings, complaints, social circumstances and external causes of injury or diseases. The current Swedish translation of ICD-10 was created in 1997 [72].

2.10. THE PAEDIATRIC EMERGENCY DEPARTMENT

A child presenting in at the Emergency Department is first being triaged by an experienced registered nurse, who prioritize the child depending on the child's symptoms. In the next step the child will be examined by the paediatrician or paediatric surgeon in charge, who can chose to send the child for radiological examination or other relevant examinations. There is several health professionals involved in managing the child throughout its hospital care, all with aim is to arrive rapidly at the correct diagnosis and to start relevant treatment. In a busy Emergency Department, where many patients are seen each day, it is easy not to think about the possibility of child abuse and overlook the diagnosis [33, 73]. However, this simple statement is complicated by the existence of many social taboos surrounding child abuse and neglect and it is a lot easier for nurses and other paediatric care professionals to make the socially quite acceptable diagnosis of accidental trauma rather than child abuse – even when the latter diagnosis is clearly more likely [35, 54, 74]. There are important and strong psychological defence mechanisms developed by health care professionals making them unable or unwilling to identify child abuse [54, 75, 76]. Several authors have reported lack of formal education as a significant problem in this context. [35, 75, 77-79]. Mårtensson et al shows in a recent report that only one of four paediatric residents, and only one of three newly graduated paediatricians in Sweden, have received formal education on the topic of child abuse and neglect. Moreover, only 30 % of paediatric residents had had formal education about the Social Services Act [80]. Considering that training and knowledge are the most effective ways of mastering anxiety and prejudice, the status of education of Swedish paediatricians is worrisome to say the least.

Considering the immense associated morbidity and significant mortality rates, early detection and diagnosis of child abuse and neglect is crucial, [81, 82]. Nursing care is optimally based on a dynamic relation between patient and nurse. In order to satisfy the patient's clinical needs, the nurse should create a natural and constructive relationship with the patient for the purpose of achieving the goal of nursing care [83, 84]. In paediatric care, that relationship includes also the parents of the patient. It seems logical that there would be a relationship between the nurse work-environment and the quality of care they provide to patients and their parents [85]. Establishment of a correct diagnosis is extremely difficult if a child's caretaker is unable to or does not give an accurate history [46]. Most employees in a children's hospital need training on issues such as child abuse. Registered nurses have an advantage as they are frequently personally involved with patients, but with this advantage come a responsibility. Registered nurses are in unique position for early recognition and referral in situations of child abuse and for those families at risk for abuse [86]. Despite the growing interest in the field of child maltreatment there is a paucity of training programs [87].

2.11. NURSING APPROACH

It is important for registered nurses (RN) that they recognize themselves as human beings and acknowledges the emotional reactions that traumatic events elicit in them. Traumatic events that occur while in the line of duty intensely affect themselves and their colleagues. Recognition of their vulnerability to tragedy is a key element in the way each nurse handles the senselessness of traumatic events they are faced with every day in their professional lives [88]. Registered nurses likewise must be prepared to deal with the anger of patients, family members, physicians and colleagues - as well as their own anger [89]. There is always a possibility that patients or parents anger could escalate to violence. Registered nurses are at high risk for workplace violence because of their extended periods of direct contact with patients and parents during very stressful circumstances and their vulnerability when working in small groups or even alone [89]. A RN who have experience of encounters in stressful situations must be supported in their efforts to find understanding, safety and peace in their own lives [90]. It is even more difficult, or a greater challenge, to work with a family when the parents are suspected for abusing their own child. When parents in the US were asked about their perceptions of hospital care, it was seen that parents in the "abuse group" were significantly less likely to feel that they were treated with respect or that the medical

staff were honest with them [91]. There is no doubt that participation in the child protection process is stressful [92, 93]. The registered nurses have to clearly communicate with parents about their obligation to report any non-accidental injuries to the authorities and should deal with the parents in a non-judgemental way [34]. All medical staff whose patients include children should avail themselves regularly of educational opportunities to increase their knowledge of the epidemiology and evaluation of child abuse and neglect [30]. Registered nurses seems to learn very much from one's own experience, and from the experiences of others, therefore; the importance of supportive environment and helpers has to be highlighted [94].

Decreasing mortality and morbidity associated with child abuse is achievable through early preventive education [48, 95]. Because of the high prevalence of child abuse, the use of assessment instruments has increased in recent years [95]. The focus of child protection is directed toward prediction of potential child abuse and neglect rather than identifying abuse that has already occurred. The identification of at-risk families can be used to direct scarce resources to those most in need of special services in order to prevent future abuse. With services and support, disadvantaged parents can find increased satisfaction and confidence in their parenting roles instead of increased frustration and inability to cope [95]. Registered nurses have the opportunity to identify abused children and with a collaborative approach with other authorities, they have a chance to prevent child abuse [96].

3 AIM

The overall purpose of this thesis is to investigate how the management and the clinical investigation looked like when a child was admitted to a children's hospital because of possible child abuse and to explore what were the nurses experiences when meeting such a child.

3.1 SPECIFIC AIMS

Study I

The aim of this study is to evaluate the documentation in the medical records regarding potential AHI in infants presenting to a paediatric ED with certain primary complaints, known to be associated with AHI.

Study II

The aim of this study is to identify children diagnosed as victims of child abuse in a paediatric hospital during the four-year period of 2005-2008, with a focus on reports to social authorities.

Study III

The aim of the study is to study the association between known brain injuries that could possibly be caused by AHI, primary complaint and the clinical management these children received.

Study IV

The aim of the study is to study registered nurses' experience in encountering abused children and their parents. The objective is to assess how nurses manage to remain professional in their dealings with abused children when the suspected perpetrator is a parent.

4 DESIGN, PARTICIPANTS AND METHODS

4.1 STUDY DESIGN

This research was conducted to increase our knowledge of the area of child abuse and the dissertation consists of four studies. The design was descriptive and cross-sectional and both qualitative and quantitative methods was used. This approach was considered to be useful as it incorporated different paradigms and thereby brought different kind of knowledge to the area of child abuse management, investigation and nursing approach (figure 1).

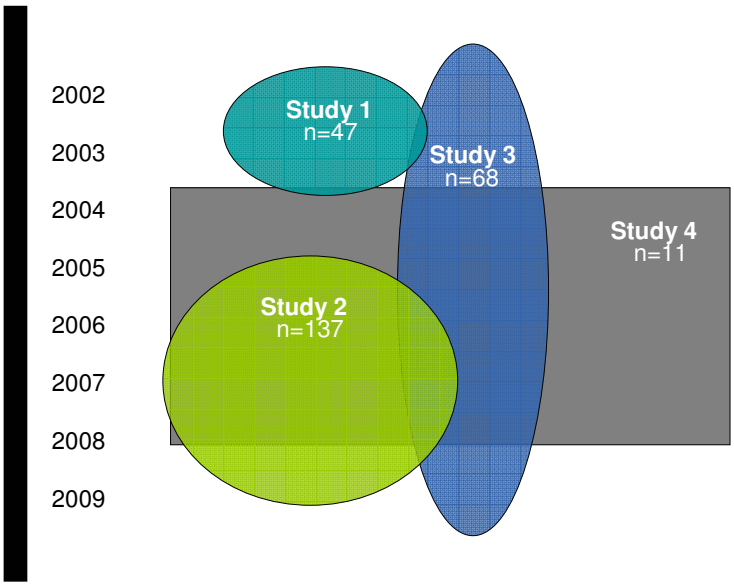

Figure 1. The association between the different studies regarding to time and included population.

4.2 SAMPLE

This research was conducted at Astrid Lindgren Children's Hospital, which is a tertiary care University Hospital for paediatric patients in Stockholm, Sweden. The entire population of this region, and the catchment's area for the hospital for tertiary care which includes all head injuries, is 1.8 million inhabitants and 350.000 of those are children between 0-18 years of age. The hospital's emergency department have approximately 44.000 visits annually. However, there are all together four acute care

hospitals in the region to which families can bring their child, regardless of their home address or state of their child. Referral notes are not required. Nine hundred twenty nurses are employed in the hospital, and are working in different specialities and in different units or wards.

4.3 SUBJECTS

Participants Study I
All children (0-18 months of age) admitted to the Emergency Department during one year (Sept 15, 2002 – Sept 14, 2003), and who came due to a primary complaint known to be associated to AHI (n=929) and who had completed a CT head scan following admission were included. The primary complaint chosen were head injury, seizures, unconsciousness, apnoea or death.

Participants Study II
All children (0-18 years of age) given a ICD 10 code concerned with child abuse during the four-year period of January 1, 2005 – December 31, 2008 were included.

Participants Study III
All children (0-2 years of age) who had completed a CT head scan during the period of January 1, 2002 – December 31, 2009, and who had an intracranial haemorrhage which could have been caused by AHI were included.

Participants Study IV
Investigators conducted interviews with 11 registered nurses who had participated in the clinical care of abused children and their parents.

4.4 METHODS

Three quantitative studies and one qualitative study is presented in this thesis.

4.5 PROCEDURE

Procedure Study I
The study group was identified using the computerized medical records database in the Children's University Hospital. All medical records, (n = 929) which included one of the selected primary complaints (head injury, seizures, unconsciousness, apnoea or death) were extracted from the database and included in the study if the second criteria, a CT-scan having been performed in association with the admission, was satisfied.

Each medical record was reviewed by two of the authors to assess whether the term "abuse" was mentioned at all or if any considerations of possible abuse had been expressed in the medical records. A checklist including criteria to establish the presence of risk factors for AHI was used during the review process.

Procedure Study II

The medical records of children diagnosed with an ICD 10 code concerned with child neglect and/or child abuse were identified retrospectively during a four-year period (January 1, 2005 – December 31, 2008).

The selected ICD 10 codes were found 306 times in the hospital's database, and concerned 301 children. The medical records were reviewed by one of the researchers (BT) by using a specific study protocol. Information was collected concerning age, gender, suspected perpetrator and whether the child has been diagnosed as a victim of abuse more than once during the study period. The definition used for child abuse was the definition that the Swedish parliamentary committee proposed in 2001:

"Child abuse is when an adult: subjects a child to physical or psychological violence, sexual assault, humiliating treatment or fails to meet the child's basic needs" [97].

Using this definition, 164 children were excluded because they were abused physically by a peer during school or leisure time (Figure 2). According to the Swedish law, reporting to the social services is not mandatory in this group of children.

Chronic illness, children treated as in-patients were registered as well as any record of reports to the social services and/or the police. Chronic illness was defined as a condition, physical, medical or psychiatric that is long-lasting, in many cases lifelong, which required long-term management. The values obtained are presented as medians (ranges) or the numbers and proportions of subjects.

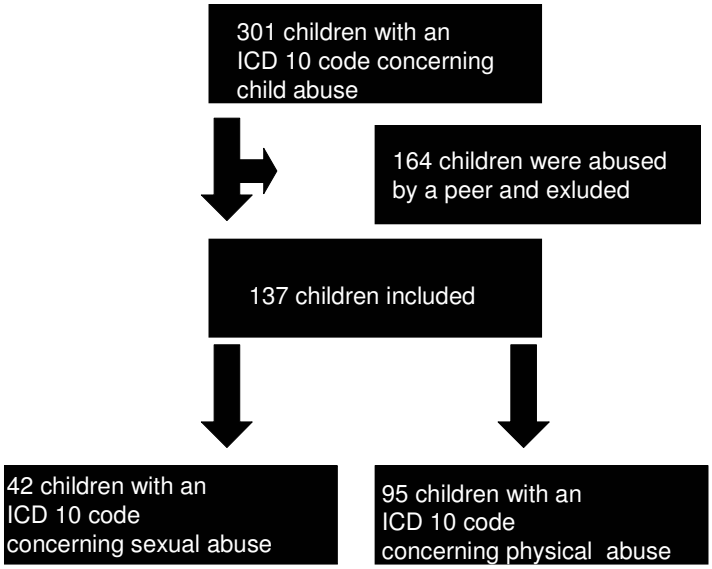

Figure 2: Flow chart of included children with an ICD 10 code concerned with child abuse (n=137)

Procedure Study III

The group of children we studied was identified using the computerized medical records database in hospital. There were 1925 medical records of children 2 years or younger, which included a report of a CT brain scan. No intracranial haemorrhage was identified in 1215 records and these were excluded. This was done as a review of the radiology reports by two of the authors (BT& A-CF). The remaining 710 medical records all described an intracranial haemorrhage in the radiology report. When the individuals behind these 710 medical records were identified, it turned out that several patients had had more than one CT scan done and that the 710 medical records including a report of a CT brain scan corresponded to 186 children with intracranial haemorrhage.

The radiological images were recovered in all 186 children with haemorrhage and were all reviewed by a paediatric neuroradiologist (OF) in order to reassess and confirm the neuroradiological findings in all cases. Haemorrhages (n = 101) obviously due to reasons other than trauma, e.g. bleeds related to the delivery, tumour or ECMO-treatment, were excluded from this study. The remaining children (n=85) all had intracranial haemorrhage that was thought to be due to trauma and could potentially have been abused. However when the full medical records of the remaining 85 study subjects were reviewed, seventeen children had intracranial haemorrhage due to motor

vehicle accidents or other witnessed violence where abuse could be excluded with confidence. These children were also excluded from the study and the remaining 68 children comprise the study group as child abuse should have been a very real and possible differential diagnosis in all of them (Figure 3).

The full medical records (n=68) of the included children were reviewed concerning:

- Whether the term "abuse" was at all mentioned
- Primary complaints as stated by triage nurse in ER
- Which ICD 10 diagnostic code was used
- Whether a report was filed to the social services
- Whether a clinical investigation of possible child abuse was performed

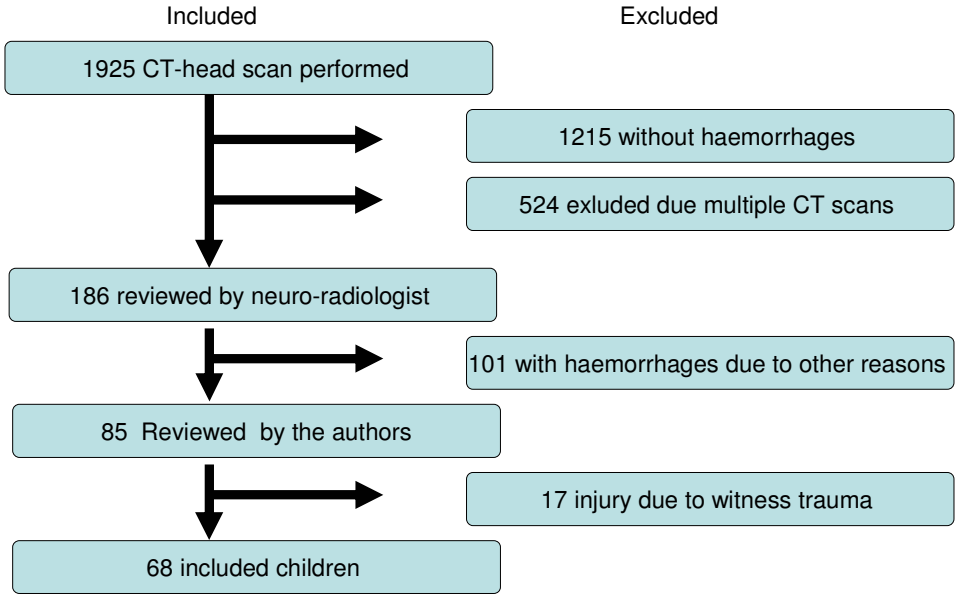

Figure 3: Flow chart of included children with an intra cranial haemorrhage possibly caused by child abuse (n=68)

Procedure Study IV

Recruitment of the participants was managed by nursing supervisors who identified nurses working in acute care wards and invited them to participate. Following general information, those registered nurses who had been looking after an abused child were invited to participate and enrolled. All enrolled nurses were included in the study. The researchers contacted the registered nurses and provided written and verbal information about the study. The registered nurses were requested to review their clinical encounter with the child before the interview session. The critical incident technique interview

started with a review of their own case. The registered nurses participated on a voluntary basis and were assured confidentiality. The two interviewers had extensive training and experience in paediatric nursing care and were well versed in the critical incident technique. Of the 11 registered nurses interviewed, ten were female and one was male a ratio that was representative of the male-female ratio among nursing staff at the hospital. Individual interviews lasted for 30–45 minutes and were recorded and transcribed immediately after the interview.

4.6 ANALYSIS OF DATA

In study I-III the child's medical record was reviewed in retrospect by two of the authors (BT & A-CF). All available documentation in the child's medical record was collected and reviewed. All neuroradiological images were recovered and reviewed by a paediatric neuroradiologist (OF). The values obtained are presented as medians (ranges) or the numbers and proportions of subjects.

In study IV a content analysis was used to categorise the data according to the model described in the literature [98-100]. The content analysis is a method well suited to analyze texts that describe, similarities, differences and patterns in people's experiences [101]. In study IV a manifest analysis was used and during the process, the authors (BT & BB) repeatedly analysed the themes, the sub-themes as well as the original text to find alternative way to interpretation. All text has a degree of interpretation, even when it comes to manifest analysis, and to ensure credibility, no relevant data was excluded or irrelevant data included [102].

4.7 ETHICAL CONSIDERATIONS

Children and their parents who receive medical care due to child abuse are in a vulnerable position and ethical aspects have to receive extra consideration when research includes children. The United Nations, Children's Convention [18] states the rights of every child irrespective of age. This means that when a small child, due to its age and immaturity, is unable to communicate or receive information, the parents are considered the child's guardians with the aim of protecting the child and their rights. This becomes a big issue when a parent may also be the perpetrator, and it is a great challenge to monitor children's rights in these circumstances. Thus, in this thesis, no child themselves has actually been involved in the research, though the design chosen

was using retrospective methods in studies I-III. Ethical considerations on the topic of interviewing registered nurses (study IV) were discussed and it was considered that registered nurses having had experience of encounters with abused children might feel bad mentally when talking about it. It was decided that professional supportive counselling was offered to all participants. Transcriptions and presentation of the data were compiled in a way that would maintain confidentiality.

Ethical approval for the studies was obtained from Regional Ethical Committee of Karolinska University Hospital (Dnr: 2006/3:9)

5 SUMMARY OF RESULTS

Our results show that the management of suspected child abuse is not optimal; when a child, that might be a victim of child abuse, is admitted to a paediatric hospital there is a lack of communication between staff members involved in different parts of the management. There is also poor documentation in the child's medical record regarding potential child abuse and important clinical investigations such as CT-head scan and ophthalmological examination including fundoscopy is not used to its full potential.

Although there is a law in Sweden that makes it compulsory for all health care professionals to report suspected child abuse to the social services, we showed that health care professionals do not report these cases in a very large numbers.

5:1 Study I

In study I we found that, out of the 929 children, that were admitted the hospital due to a primary complain that could have been associated to AHI, only 47 children underwent a CT-head scan. The main part of the 47 children we studied came to the hospital following a minor fall. In the evaluation of the child's medical record we could see that 63% of all records could be assigned to a group in which the initial history showed clear indications of possible AHI. Of the children admitted to the ED due to a head injury by history (n=41), 22 (54%) had a history that was suspicious for abuse. Nevertheless, only one of these children had a full clinical investigation of potential abuse documented in the record.

In our review of the neuroradiological investigation we could find no cases of missed pathology compared to the original reports. In 23 children the neuroradiologist found positive findings (17 children with skull fractures without haemorrhage and 6 children with intracranial haemorrhages).

In total 5 children were subject to a full clinical investigation for child abuse and one of these children was also assigned a formal diagnosis of child abuse (Figure 4). In only two of the 5 cases that did undergo full clinical child abuse investigation did we find that the suspicion of child abuse was indeed documented in the child's medical record.

In summary, of 929 children admitted with relevant complains for possible AHI, only 47 were indeed investigated with a CT brain scan and only five had the full clinical investigation for possible child abuse and one child only was in the end assigned a formal diagnosis of child abuse!

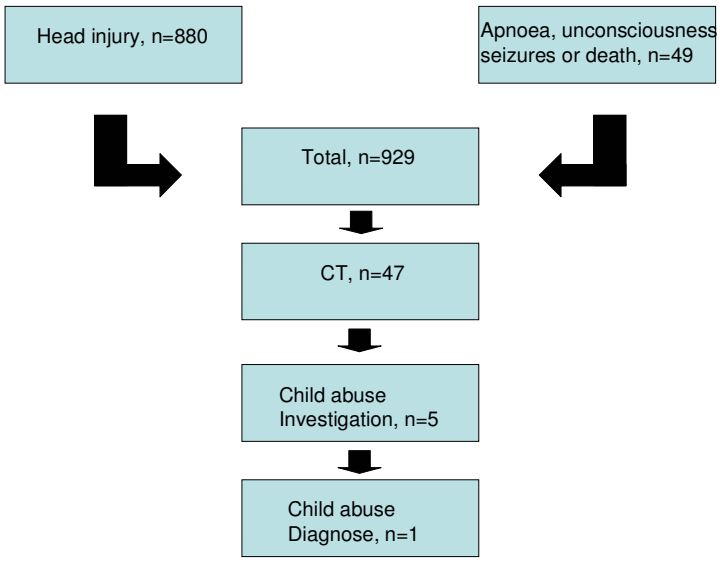

Figure 4. Flow chart of number of all investigated children (n=47).

5:2 Study II

In study II we found that most of the children who were assigned a formal diagnosis relevant for the medical diagnosis of child abuse were treated as out-patients in the ER. Just a few children were admitted as in-patients (1/42 sexually abuse children and 16/95 physically abused children).

We found further that medical staff filed a report to the social services in only 63 % of the cases that were diagnosed as sexually abused and in 51 % in the group of physically abused children. In the group of physically abused children we found that a report to the social services was more frequent if the child was one year old or younger (11/12 children that were one year old or younger) than if the child was older than a year.

One reason quoted in the records for not filing a report to the social services was when the parents themselves informed the medical staff that they already had an ongoing contact with the social services. This turned out to be the reason for not filing a report in 3/42 cases among the sexually abused children and in 11/77 among the physically

abused children. Indeed, despite a clear legal responsibility, no further report was filed by the medical staff in connection with the studied admission to ER.

Judging from the child's medical record, a police report had been filed in 50% of the sexually abused children and in 63% of the physically abused. Most of the police reports had been filed prior to the child's arrival in the hospital by a caregiver and/or as the police escorted the child to the ER. The medical staff filed a report in 6/42 (14%) cases in the sexually abused children and in 9/95 (9%) cases in the physically abused. Filing a police report is optional and is not required by law.

There was a note in the child's medical record about the suspected perpetrator in 100/137 cases. The suspected perpetrator was named by the child or the child's caregiver. A majority of the children with an ICD 10 code indicating sexual abuse had stated that the suspected perpetrator was an individual known to the child but not belonging to the child's immediate family (22/42). The most commonly named perpetrator in this group was a day-care worker or baby-sitter (7/22). In the group of physically abuse children the most commonly named perpetrator was a close relative (52/95). Nine children reported two or more perpetrators.

We could also find in study II that the attending paediatrician planned a follow up in 45% of the sexually abuse children and for 7% of the physically abused children.

Nineteen percent of the children diagnosed with sexual abuse had an underlying chronic illness: five children with a disorder of neurobehavioral development and three with physical illnesses (obesity, hearing loss and enuresis). In the physically abused 18% suffered from chronic illness: 8 had a disorder of neurobehavioral development and 9 a physical illness (asthma, allergy, heart disease and obesity).

5:3 Study III

In study III, we reviewed all children who had completed a CT-head scan and had an intracranial haemorrhage, possibly caused by AHI. We found that the most common reason for such a child to visit the ER, was a fall from a low height (28/68). 23/68 children were dropped on the floor or in a flight of stairs by a caregiver. Children with

a history not including an accident comprised 13 of the 68 while four children were admitted to the ER with multiple traumas.

Forty-eight children of the 68 studied children had both a skull fracture and an intracranial haemorrhage, most commonly an epidural haematoma (EHD) directly associated with the fracture. Twenty children had only an intracranial haemorrhage; all had subdural haematoma except one with a subarachnoid haemorrhage.

We reviewed the child's medical record and found that 13/68 had a note in their medical record documenting that the child was a possible victim of child abuse. However, twenty-eight children who had a documented history that should have raised the suspicion had no such suspicion expressed in their medical records.

A total of 30 (44%) children were clinically investigated for possible child abuse. The frequency of such investigations was highest among children who had medical complaints and lowest among those who had been dropped. A total of 21 children underwent fundoscopy of as part in the clinical investigation. A total of 22/68 (32%) of the included children were reported to the social services.

We also could show that when the neuroradiologist's report suggested that child abuse could be a possible explanation for the findings on the CT-scan, the number of clinical child abuse investigations, as well as the reports to the social services, was increased in that group compared to the rest. (Table 1).

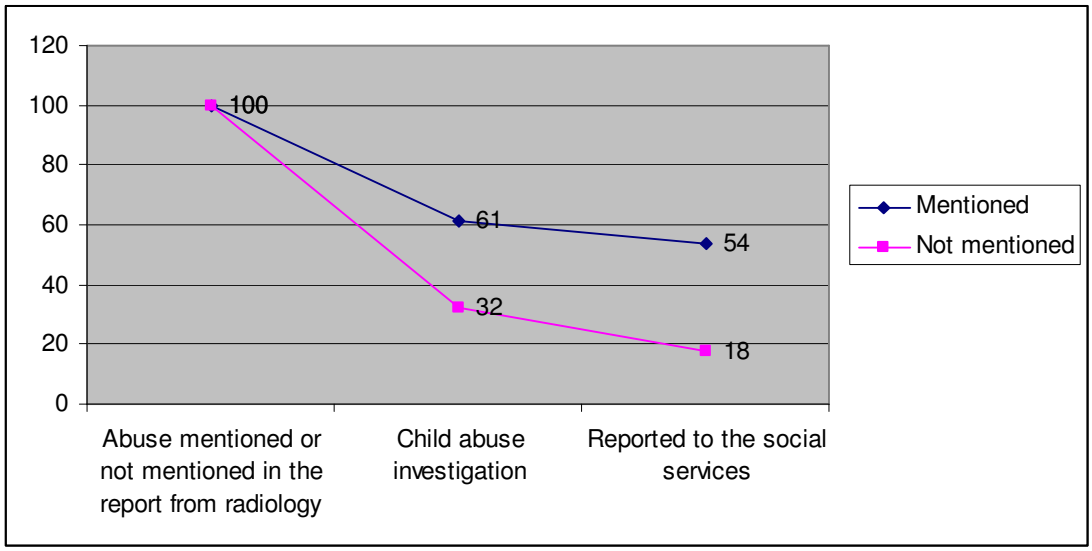

Table 1. Number of cases investigated and reported to the social services when neuroradiology suggested or did not suggest child abuse as a possible cause of injury. The numbers are presented in percent and are calculated on the total number of cases "suggested" (n=28) or "not suggested" (n=40)

An incidence number was calculated, based on the number of included children and the annual number of births in Stockholm. The incidence of AHI in this study was 15/100 000 children.

5:4 Study IV

In study IV we highlighted three areas in the analysis of the interviews; feelings of emotional ambivalence, registered nurses' professionalism and the registered nurses' care strategies.

One problem that emerged from the interviews was the difficult relationship between the RN and the alleged perpetrator who nearly always was a parent. The registered nurses expressed feelings of both hate and empathy for the circumstances of the child's family. Some registered nurses expressed concern that they were not prepared for taking care of this kind of patients.

Another area that emerged from the interviews was that the registered nurses found it difficult to keep their professional approach when facing the parents if they knew they were the potential perpetrator. Since the nursing role is not to be judgemental, but to care for the abused child in the best way possible, the nurses were unhappy in their conflicting role of both "policing" and nursing

Registered nurses who meet abused children described a need for psychological support. The registered nurses suggested that the support could be informal where their feelings about child's abusive situation could be discussed with colleagues. At times, referral for more formal psychological counselling may be appropriate.

6 DISCUSSION

6.1. Results

Several studies have stated that health care professionals underreport cases of child abuse to the social services [22, 46, 103-106]. In study II and III we can confirm that this is the case. In study II it is shown that only 62% of the children diagnosed as victims of sexual abuse were reported to the social services and only 51% of the physically abuse children In an investigation performed in the USA, with a similar design as ours and involving approximately the same number of annual visits, Keshavarz and co-workers [107] found that 106 cases of abuse were reported to the child protection services during a 2.5 year period, whereas in our study we found only 76 such cases reported by the doctors during a period of four years. Van Haeringer and colleagues in Australia [22] found that 43% of all doctors had elected not to report cases of suspected child abuse and the investigators concluded that the probability for a child to be identified and reported as abused can be compared to a lottery. In our study (study II), younger children and children diagnosed as victims of sexual abuse were more likely to be reported to the social services.

The Social Services Act in Sweden (enacted on January 1 1982), requires all health care professionals (as well as teachers and other school staff, police officers and day care providers) to report even suspected cases of child abuse and neglect to the social services [4]. The consequence of this law is that all health care professionals in a children's hospital have an obligation to file a report to the social services when needed. As we showed in study III, only 61% of all children were reported to the social services even when the radiology report described and then suggested child abuse as a possible cause of injury. One could argue from the standpoint, that all health care professionals has a responsibility to report suspected child abuse, that there should be routines established in the Department of Radiology outlining the procedure for the neuroradiologist reporting suspicious cases of child abuse directly to the social services when the neuroradiological study is reported. This would allow an almost "automatic" report based on only the undisputable finding of an intracranial haemorrhage without a history of a fall from a high level or a motor vehicle accident. Although this would be in line with the current legislation, this may not be an optimal procedure The responsibility to report must fall on the attending paediatrician or surgeon as well as

nurses who are in close contact with the child and it's family. However, cases do occur, when the neuroradiologist is unable to convince the clinician about the significance of the suspicion and a report is not filed. In such rare cases it would be not unreasonable for the neuroradiologist to feel obliged to file a report himself. The neuroradiologist has the advantage of not being influenced by any contact with the parents who may generate prejudice for or against the parents. It is crucial for the child that is abused that a report is being filed as, according to Swedish legislation, the social services is the authority that has responsibility for the child's safety and is the authority assigned to protect the child. It is obviously a serious problem when physicians and nurses in Sweden do not follow the legislation of the land, a law we are obliged to abide by.

There are, however, a host of factors that affect the ability and willingness of the attending physician to file such a report. Factors that act prohibitive and reduce the frequency of filing such reports include: to know the family, lack of knowledge about not only the signs of child abuse but also about the proper procedures for reporting to the social services, fear that a report would not improve the patient's situation and concern about maintaining a good relationship with the parents [22, 103-106]. In study II a reason given for not filing a report was that the parents quoted that they already had an ongoing contact with the social services. But according to the social services act the health care professionals still has a responsibility to inform the authorities whenever suspecting child abuse. More studies in the area of reporting patterns and attitudes among physicians are necessary to change the attitudes and to design procedures in order to increase the number of abused children reported to the social services.

The International Statistic Classification of Diseases and Related Problems (ICD) is the standard system used to classify health conditions in health datasets [108]. In study I, in whom 929 children were admitted with relevant complains for possible AHI, one child only was in the end assigned a formal diagnosis of child abuse! The other children in that study were assigned to other diagnoses such as different kinds of head injury and seizures in ICD 10.

The children who attend to the ED and get a diagnosis related to child abuse belong to a group of children that have been identified as victims of child abuse by the attending physician. Nevertheless, our knowledge about this specific group is limited. There is a lack of research around this particular group and we do not know to what extent they

are reported to the social services and the police and how they are followed up. Hence the aim in study II was to identify those children who had been reported to the social services and the police among all children diagnosed as victims of child abuse in a large Children's hospital during the four-year period of 2005-2008. The hospital in which study II is conducted is a large tertiary care University Children's hospital that treats approximately 44. 000 patients annually but only 42 children were diagnosed as having been abused sexually and 259 as physically abused during the four-year period we investigated. It has been extensively documented that only a small percentage of children who are physically or sexually abused receive attention by the authorities. Reliable data on the true incidence of child abuse is difficult to obtain, but population based studies on self-reports indicate an incidence that is ten-fold higher than those documented by official statistics [7, 9, 10, 12, 37, 109]. A majority of our cases were treated as out-patients in the Emergency Department and therefore uniform guidelines, training and continued education must be focused on the medical staff in emergency departments in order to improve awareness of the signs of child abuse.

The paediatric hospital we studied provides both surgical and medical care, and the frequency of abuse was found to decrease after the age of 14. Patients older than 15 or 18 years of age were referred to the adult department of surgery or medicine respectively. Sexually abused girls that had already entered puberty were generally referred to another hospital with a specialist clinic for female rape victims.

In studies I and III we re-evaluated all neuroradiological images and found no missed cases of pathological findings. We also found that it would have been a benefit if the neuroradiologists had suggested child abuse more often than they did, as we proved that cases in which the neuroradiologist suggested child abuse were twice as likely to be fully investigated for possible child abuse. Several studies have stated that CT head scan is the single most important and readily available tool for detection of possible abusive head injuries [53-55]. Nevertheless, the number of children who underwent a CT- scan in study I is low. Only 47 children (5%) out of the initial 929 children had a CT -scan. Recent reports have linked therapeutic radiation in early infancy to adverse effects on cognition and risk of cancer later in life [67, 110]. This paper added to a general fear of adverse effects of radiation in general and may raise concerns about possible adverse effects also from radiation for diagnostic purposes, particularly CT-

scanning of the head. The fear of adverse effects from radiation may indeed explain some part of this low frequency of radiological investigations.

It may also be possible that there is a general conception in the Swedish health care system that child abuse is rare and yet readily detectable on clinical examination, an opinion held even by paediatricians. This assumption will lead to the misconception that ancillary tests such as radiology and neuroradiology are not needed for the diagnosis. Thus our reluctance to perform CT-scanning on wide indications results in a low diagnostic yield and very likely a large number of missed cases of true child abuse.

To identify child abuse among all children that attend the paediatric emergency department is a challenge for the paediatric medical staff and nurses. In our study we found little or no documentation in the medical records that were of any help to the medical staff in identifying child abuse. Jenny et al [46] reports that if an abused child has normal respiration, no seizures, no facial or scalp injuries and comes from an intact family, the probability that child abuse would be recognized as the cause is less than 1 in 5.

The lack of adequate documentation in medical records concerning identification of child abuse could have had an impact on the incidence rate in this study. The fact that this study is based on retrospective documentation could imply that other, not documented, findings were discussed and considered at the time of the event. That could mean that even when the paediatricians have identified abused children they are reluctant to document this fact in the medical records. In addition, it was clear from this study that even when child abuse was mentioned there was no information pertaining to whether or not appropriate action was taken.

Billmire [41] showed that 64 percent of all head injuries with complicated skull fractures, and 95 percent of serious or life-threatening head injuries were due to child abuse. In study I, 6 children had intracranial pathology but only 2 of them underwent a full investigation for child abuse. The dominance of the age group younger than 3 months, in study I, is worrisome as it is known that most shaken infants are around 4 months of age [42, 50, 111].

It is well known that a patient history that changes over time is predictive of child abuse, a fact which has been highlighted by Hettler and Greenes, [112] who showed a strong association between a change in the initial history and the likelihood of abuse [112]. The review of the medical documentation performed by us in study I showed that over half the children in our study had an inconsistent history that had been documented. Could it be that, because we looked at the medical records retrospectively, we were able to focus on one specific value (abuse) and therefore found more suspicious cases, that we too easily interpreted these as indications of abuse? However, the discrepancy between the number of child abuse investigations we found and those that were potential and should possibly have been done, has to be further investigated.

In study III we found that when the neuroradiologist suggested child abuse as a possible explanation to the neuroradiological findings the medical staff investigated nearly double as many cases as when the neuroradiologist did not suggested child abuse as a possible diagnosis. The paediatric radiologist and neuroradiologist in particular, has an important role in detecting abused children in the hospital but there is often a lack of communication between professionals both within and between agencies charged with the care of children [5]. More development in the area of cooperation between specialities and specialists working in the hospital is vital to ensure that the attending physicians do not miss cases of abuse due to poor routines or lack of guidelines.

In study I and III the number of children identified as abused is low compared to other international researcher's information on incidence [40-43, 50, 113, 114]. Strong psychological defence mechanisms may prevent health care staff from drawing even obvious conclusions [74]. Another possible explanation could be that the abused children "hide" among other patients in the hospital, i.e. the abused children attend the emergency department with non-specific of different primary complaints and are therefore not identified by those selection criteria used study I, or that a CT head scan had not been done and therefore the case was missed in our studies, as was the diagnosis of child abuse

In study II we found that the number of children diagnosed as potential victims of child abuse children with an associated chronic medical or neuropsychiatric disease was similar in number as in other researchers studies. For instance, Janson and co-workers [27], found that 16% of children exhibiting some form of chronic disorder were also

abused physically (in the group without chronic disorder 8% were abused physically). Moreover, Sullivan [115] reported that children with neuropsychiatric disease are 3 to 4 times more likely to be abused than their peers without a neuropsychiatric disease. In an investigation of the shaken baby syndrome, King and colleagues [50] observed that 5% of the infants diagnosed with shaken baby syndrome had a chronic medical or psychological disease that preceded the abuse. In our study 18% of the children physically abused and 19% of the sexually abused demonstrated chronic disease prior to the abusive event compared to an incidence of chronic disease in approximately 10-15% of children in the Swedish population [116].

Physical and sexual abuse contribute substantially not only to child mortality and morbidity, such abuse also exerts a long-lasting influence on mental health, drug and alcohol misuse, obesity and criminal behaviour persisting into adulthood [9, 117-122]. Lansford and colleagues [123] found in their prospective longitudinal data that parent-reported physical abuse in the first 5 years of life predicted subsequent child-reported substance abuse in early adolescence for females but not for males [123]. In addition abused children performed less well educationally than their peers [19, 117, 124]. Such long-term consequences provides strong motivation for the development of preventive strategies beginning already during pregnancy as well as preventive and therapeutic strategies for application during early childhood and thereafter [9, 125, 126]. In study II we found that only a small fraction of all children have a documentation of any kind of follow up. In the sexually abused group, a follow-up was planned for 45% (n=19) of the children, whereas the corresponding value for the physically abused children was 7% (n=7). The most common follow-up was for medical reasons (n=8) followed by referral to an out-patient psychiatric counselling contact (n=4) or a referral to another clinic (n=4). There seem to be a lack of understanding the importance among medical staff of the necessity to follow up this group of children, both in a short term perspective as well as in a long term perspective.

Sweden has since 1979 legislation banning the use of corporal punishment or violence in raising children and it is possible that this fact could, at least in part, explain the low incidence of child abuse obvious in the results of our studies. Although this law has had an effect on the incidence of corporal punishment the official statistics do not show a reduction in the rate of severe cases of abuse of infants [3]. Moreover, there is no evidence to suggest that the incidence of child abuse in a Swedish population should be

lower than that in other countries. It is not possible to free one self from the irritating thought that we might be missing most cases of child abuse in a naïve attitude to our obligation to report any suspicion of child abuse to the authorities.

In study IV we could show that registered nurses experienced difficulties in their encounter with parents that are suspected perpetrators. The registered nurses had major problems to cope with their own feelings. It was well reported in the interviews that the registered nurses' main task was to care well of the abused child. All registered nurses reported that they did not have a professional problem in the caring situation with the children but all registered nurses had problems to deal with the dual task, being both a "police" and a nurse at the same time. The importance of counselling was obvious in this study. The registered nurses have to clearly communicate with the parent their obligation to report any non-accidental injuries to the authorities, and should deal with the parents in a non-judgemental way [34].

Several registered nurses gave practical suggestions of how to develop good routines when facing these kinds of families. Most important was good knowledge about child abuse but also to know what happens during the investigation. All practitioners whose patient panels include children should avail themselves regularly of educational opportunities to increase their knowledge of the epidemiology and evaluation of child abuse and neglect [30]. In our study the registered nurses felt that the parents needed education as well, especially about the consequences of child abuse in infants. Also the focus of education should be on childcare staff and potential childcare staff. It is obvious that new parents should be informed through prenatal care, community education, and their primary care provider. In the postpartum unit, information about the dangers of shaking an infant should be part of the standard discharge teaching. In the western region of New York State, Dias and co-workers [125] showed that educating parents of newborn infants prior to discharges from the maternity ward reduced the incidence of abusive head injury by 47%. Death or brain damage is an extremely high price for infants, their family and society to pay for the effects of a few seconds of uncontrollable rage [113]. Focused training and intervention program of parents and medical staff has been shown to have an effect to decrease the number of abusive head injury in the society [125, 127-129]. With services and support, disadvantaged parent can find increased satisfaction and confidence in their parenting roles instead of increased frustration and inability to cope [95]. Registered nurses have

the opportunity to identify abused children and with a collaborate approach with other authorities they have opportunities to prevent child abuse [96]. Despite the hospital-wide clinical guidelines on child maltreatment, many registered nurses in this study expressed the need for more extensive guidelines and protocols in this field.

Several of the registered nurses expressed the emotional state that occurs when they get provoked by the parents. The registered nurses expressed a feeling of difficulties to suspect child abuse when the parents were nice and gentle even if they knew that it is difficult to expose a perpetrator based on their behaviour. If a child's caretakers cannot or will not give an accurate history, making a correct diagnosis is extremely difficult [46]. Most employees at the children's hospital need education on issues such as child abuse. Registered nurses have an advantage as they a re frequently personally involved with patients, but with this advantage comes responsibility. Registered nurses are in a unique position for early recognition and referral for both victims of child abuse and for those families at risk for abuse [86]. However, the registered nurses in this study felt uneducated and therefore they experienced problems to meet and care for these families. Despite the growing interest in the field of child maltreatment it is a paucity of educational programs [87].

6.2 The general study design

In three of this thesis' four studies (Study I-III) the main design has been a retrospective review of medical records. The fourth study had a qualitative design. One limitation of using medical records in retrospective studies is that it is based just on information that is documented. If for example a clinical investigation has been carried out or a report to the social services had been filed, without being documented, it is not included in these studies and may have been missing. The data about each case is limited and there could be discordance between the care truly given to patients and what has been documented in the child's medical record. However, it would be difficult to imagine what circumstance would be present if such an omission in documentation was felt appropriate by the attending paediatrician.

Another possibility that would have prevented us from identifying cases relevant for our investigation would be if children regarded and managed as having been abused were in reality registered with an ICD 10 code that did not cover child abuse. Thus it is

our experience that using ICD 10 codes in order to undertake a comprehensive audit of all abused children is not advisable. Some children could erroneously be diagnosed without having been abused and even more children have been abused but not diagnosed [24]. The definitive diagnosis of child abuse is difficult to ascertain [24]. In a previous study Jenny et al [46] identified a tendency to under-diagnose child abuse. Under-reporting of child abuse to social services has also been highlighted in several reports [22-24]. Because of fear of being wrong or causing guilt feeling in parents, clinicians are often uncomfortable in applying a code that includes child abuse[130]. As King and colleges discussed in their study [50] these results may not reflect the true number of abused children in a society and hence we are unable to estimate the incidence of abused children. Moreover, valuable information, such as socio-demographic characteristics, were poorly described or documented in the patient records we examined.

Assuming that children with abusive head injury indeed do get the medical care they need but without having the proper medical diagnosis of abuse assigned, we conducted our study III. In this study the aim was to turn the perspective around and study how neuroradiological findings, known to be associated with child abuse, are correlated to clinical investigation and subsequent clinical diagnosis of child abuse. By selecting all CT-scans in children below 2 years with findings of intracranial haemorrhage without a reliable explanation by history, we assume that we have identified all children who had been abused and suffered severe enough head injury to need medical care. Only a small minority of these children were indeed diagnosed as being abused while the remaining children were assigned other less sensitive diagnoses. Nevertheless, by using this technique we are able to say something about the true incidence of abuse causing AHI and can for the first time approach the difficult issue of the number of unrecorded cases of child abuse. By using this technique we found 68 children who could very well have been abused. Thirty children had some clinical investigations performed and 22 were reported to the social services but only four (Sic!) children were assigned the formal diagnosis of child abuse. Thus for every child diagnosed as being abused, another 17 children were likely also abused and for every child reported to the social services another two should also have been reported!

In Sweden there are no official or scientific reports of incidence of AHI or other forms of abuse of infants. Consequently, we do not know how common it is that infants are

abused in Sweden today. Nor is there any evidence that the incidence would be significantly different in Sweden than in other countries or cultures. In England it is considered that 1/1000 children aged 0-4 years every year are exposed to serious physical abuse, all types included. Assuming similar conditions in Sweden, with an annual birth rate of just over 100 000 births per year, would mean that there could be about 100 seriously abused children per cohort aged 0-4 years in Sweden.. However, the calculated probable incidence of AHI in study III is 15/100 000 children and this is to be compared with other incidence studies published around the world [40-43]. These studies have shown incidence figures of AHI between 17 and 40/100 000 children. It appears as if Sweden may very well have an incidence of AHI that is not much lower than other countries in the industrialized world.

In study IV content analysis was used. In the use of this method the credibility or reliability and validation were considered by using the procedure described by Lundman and Graneheim [131]. Reliability in qualitative work involves consistent coding of the same text in the same manner, which we attempted to optimize by allowing two of the authors to read the text and code it independently and having the third author check and agree with their joint conclusions. We were inspired from critical incident technique (CIT) when we conducted the interviews. Flanagan [132] describes CIT as a method to collect information about specific critical incidents related to the behaviour under investigation. CIT is unlike other qualitative methods in the way that CIT are more focused on providing solutions to practical problems and learning [133-135]. All content analysis, even of a manifest text, involves some degree of interpretation by the individual performing the analysis [136]. We attempted to minimize any subjectivity which might have been associated with such interpretation by involving an author who was unfamiliar with the circumstances concerning each nurse who had met an abused child in the coding process. Our findings must be seen in the light of the 11 nurses who were included in the study; however, the result could probably be applicable to the experiences and needs of nurses who meet abused children.

7 CLINICAL IMPLICATIONS AND FUTURE RESEARCH

The data which emanated from the present thesis was hoped to elucidate some, but not all, important aspects of the current situation for children that are suspected to be victims of child abuse. On the basis of our findings it is possible to create new comprehensive management guidelines for this group of children, and the results from this research are valuable in our future work with children who are victims of child abuse. However, there appear to be some important lessons, which should be taken into account when developing future management plans. A major issue emerging from this research is the very strong need to improve communication between different staff members in a hospital. It might by useful to use a structured protocol to develop good routines. More research in this area is needed.

As showed in this thesis the vast majority of the children, suspected to be victims of child abuse, were treated as out-patients. It must be considered crucial to establish and enforce routines and clinical guidelines in the emergency department. It is obvious that it is in the emergency department that these children must be identified first and it may be the medical staff at the emergency department that should initiate and file the reports to the social services.

The creation of teams of experts (Child Protection Team, CPT) is a route often chosen by Children's Hospitals in the US and Canada. Such a team will provide medical assessment referral and diagnostic services for all forms of child maltreatment. The team's primary responsibility would be to consult on all suspected child abuse cases, facilitate timely reporting of alleged child maltreatment; involve community partners as appropriate; track information on child maltreatment cases and help formulate hospital policies and procedures regarding child abuse [137]. Creation of such a team would be helpful in the work with identifying children suspected to be victims of child abuse. A CPT that is available to the medical staff could make a big different by guiding the medical staff through the medical- and forensic investigations. It would also be important in the perspective of follow ups, which in this thesis we found was poor.

This thesis also demonstrates that the management regarding reports to the social services is not optimal. It is shown in these studies that the number of children reported

to the social services is low, even if the medical staff does identify children who might have been abused. More research on why the physicians or the registered nurses do not report abused children is necessary. It is, of most interest, important to evaluate the physician's and registered nurses' awareness of the legislation and attitude to do such a report. In study II we found a very low percentage of reported cases and this is an area of interest for further research. We could explore the frequencies of reported children in other hospitals in Sweden or to carry out interventions focused on reporting to the social services and study the frequency of reporting in a follow up.

One major challenge in the field of child abuse is determining the frequency with which child abuse occurs. In this thesis we have not succeed to calculate a true incidence of child abuse, as the design of the included studies have not been optimal for such calculation. In the light of our results it would have been important to investigate how many of all children admitted to the ER with a primary complaint, known to be associated with AHI, have a positive finding in the CT head scan. With that kind of design we could calculate the true incidence of AHI. There are, however, some important ethical issues to discuss when planning such a study. Is it ethically correct to let so many children undergo a CT head scan, with its risks, to explore the incidence of AHI?

8 POPULÄRVETENSKAPLIG SAMMANFATTNING PÅ SVENSKA

Barnmisshandel har på senare år tilldragit sig stort intresse i Sverige och forskningen inom området har ökat. I denna avhandling berörs alla former av misshandel, från försummelse till fysisk misshandel och sexuella övergrepp på barn 0-18 år. De studier som ingår i avhandlingen har gjorts på ett barnsjukhus, med 44 000 besök årligen på sin akutmottagning. I avhandlingen belyses ämnet barnmisshandel utifrån sjukvårdens perspektiv, dels mötet med de misshandlade barnen, dels handläggningen av ärenden där misshandel kan ha varit en orsak till att barnen kom till akuten.

I studierna I-III har journalgranskning använts som metod. I studie I undersöks hur många barn som sökt akuten för symtom som är nära förknippade med skakvåld mot spädbarn samt hur skadorna och den kliniska utredningen gått till. Alla barn som var under 18 månader och som sökte akuten under ett år, med någon av följande sökorsaker inkluderades: skalltrauma, medvetslöshet, andningsuppehåll, kramper eller död, och med samtidig datortomografiröntgen av hjärnan genomförd. Vi fann 47 sådana barn. Vi fann, efter att ha läst samtliga journaler, att totalt 5/47 barn utreddes för barnmisshandel och att 1/47 barn fick en misshandelsdiagnos.

Studie II utgår ifrån handläggningen av barn som erhållit diagnosen barnmisshandel enligt ICD 10-systemet. Studien kartlade alla barn under en fyraårsperiod (2005-2008). Under denna tidsperiod fick 301 barn en diagnoskod som relaterade till misshandel. En grupp barn exkluderades och det var barn som blivit slagna av en jämnårig person, detta eftersom socialtjänstlagen inte förbinder oss att göra en anmälan i dessa fall. Totalt 137 barn ingick i studien, 42 med en diagnoskod rörande sexuella övergrepp och 95 gällande fysiskt våld. Bland de barn som fått en diagnoskod gällande sexuella övergrepp anmäldes 62 % till socialtjänsten och för barn som varit utsatta för fysiskt våld anmäldes 51 %.

Då vi inte hittade de barn som varit utsatta för skakvåld i studie I, när vi inkluderade barn med hjälp av kända sökorsaker, ville vi nu istället se om vi kunde hitta dem genom att använda oss av det säkraste sättet att ställa diagnosen – datortomografiundersökning av hjärnan. Med hjälp av det datoriserade journalsystemet på röntgen fick vi fram alla barn, under två års ålder, som gjort en datortomografi av hjärna under tidsperioden

2002-2009. Under denna tidsperiod hade 1925 röntgenundersökningar genomförts på barn under två år. Av dessa fanns 186 barn som genomfört en datortomografiundersökning och som hade en hjärnblödning som fynd, 101 av dessa barn hade en blödning vars orsak inte tydde på misshandel, och 17 barn togs bort på grund av att det fanns en dokumenterad olycka, med vittnen (tex. trafikolycka med ambulans på plats). Totalt 68 barn kom att ingå i studien. De flesta barnen som hade en misstänkt hjärnskada hade ramlat (28 stycken) eller blivit tappade (23 stycken). 13 barn hade kommit till sjukhuset av medicinska orsaker som kramper, medvetslöshet eller liknande. Fyra barn hade varit med om ett multitrauma och därför fått genomgå en datortomografiröntgen av hjärnan. 20/68 barn hade en hjärnblödning utan fraktur som fynd och 19/20 hade en blödning under hårda hjärnhinnan (subduralt), vilket är ett vanligt fynd när barnet har skakats. Totalt anmäldes 32 % av barnen till socialtjänsten av sjukvårdspersonalen. Antalet anmälningar ökade (till 54 %) i de fall där röntgenläkaren skrev i sitt röntgensvar att misshandel skulle kunna vara orsak till röntgenfynden och därmed måste uteslutas. Samma mönster fann vi också vad det gäller de kliniska misshandelsutredningarna. Då röntgenläkaren uttryckligen skrev att barnmisshandel ska uteslutas så utreddes 61 % av barnen för misshandel vilket skall jämföras med 32 % då röntgen inte skrev ut misshandelsmisstanke i klartext i sitt svar. Totalt 4 barn fick en misshandelsdiagnos och två av dessa anmäldes till socialtjänsten.

I studie IV ville vi utforska hur sjuksköterskor upplevde mötet med ett misshandlat barn och dess föräldrar. Särskilt komplicerat blir detta om barnets föräldrar också är de misstänkta förövarna. Dessa sjuksköterskor hade under sin tid på arbetet träffat på misstänkt misshandlade barn i olika vårdsammanhang. En innehållsanalys gjordes på materialet efter utskrift. Sjuksköterskorna hade särskilt problem med den dubbla roll, av att både att vara övervakare (polis) och att vara vårdare (sjuksköterska), de hamnar i under dessa omständigheter.

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