PARENTAL KNOWLEDGE, ATTITUDE, CONCERN AND PRACTICE TOWARD FEBRILE CONVULSION IN HOSPITAL UNIVERSITI SAINS MALAYSIA (HUSM)

by

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CERTIFICATE

This is to certify that the dissertation entitled Parental Knowledge, Attitude, Concern and Practice Toward Febrile Convulsion in Hospital Universiti Sains Malaysia is the bonafide record of research work done by Lew Ya Hui 99041 during the period of July 2010 to April 2011 under my supervision. This dissertation submitted in partial fulfillment for the degree of Bachelor of Health Sciences (Nursing). Every research work and collection of data belongs to Universiti Sains Malaysia.

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LIST OF ABBREVIATIONS

CNS	**Central Nervous System**
CT	**Computed Tomography**
EEG	**Electroencephalogram**
FC	**Febrile Convulsion**
HUSM	**Hospital Universiti Sains Malaysia**
KACP	**Knowledge, Attitude, Concern, Practice**
SCT	**Social Cognitive Theory**
SD	**Standard Deviation**
SPSS	**Statistical Package Social Science**

PARENTAL KNOWLEDGE, ATTITUDE, CONCERN AND PRACTICE TOWARD FEBRILE CONVULSION IN HOSPITAL UNIVERSITI SAINS MALAYSIA (HUSM)

ABSTRACT

Introduction: Febrile convulsion (FC), also known as a fever fit or febrile seizure, is the most common seizure disorder that occurs in childhood after age one month. The majority of parents were frightened on witnessing FC in their children. **Purpose:** To explore the level of parents' knowledge, attitude, concern, and practices (KACP) regarding FC at Hospital Universiti Sains Malaysia. **Method:** A cross-sectional study conducted over a period of two months with 55 respondents fulfilling the study criterias were recruited. Respondent's level of KACP was measured using FC parental KACP questionnaire. Statistical analyses were performed using descriptive, independent t-test, Pearson's correlation and one-way ANOVA test. **Results:** The knowledge score of respondents regarding FC was not very satisfactory with mean score of knowledge was only 3.18 ± 1.71. The total scores of attitude were 25.2 ± 8.28, concern 37.4 ± 6.06 and practices 6.51 ± 1.47. Lack of knowledge caused parents to have extremely high concern, negative attitude and moderate practice toward their FC children and this result was significant when tested with Pearson's correlation test ($P=0.002$). The most common fear expressed was brain injury (87.3%), FC can be outgrown (83.7%) and the child might die from the seizure (45.5%). There were no associations between demographic factors with parental KACP toward FC ($P>0.05$). **Conclusion:** It can be concluded that there is a need to provide more awareness for improvement among parents to update their knowledge in caring for a child with FC.

Enhancing knowledge can help the parents to intervene and allay fears when witnessing their child in an acute FC episode.

PENGETAHUAN, SIKAP, KEPRIHATIN DAN AMALAN IBU BAPA TENTANG DEMAM SAWAN DI HOSPITAL UNIVERSITI SAINS MALAYSIA (HUSM)

ABSTRAK

Pendahuluan: Febris Konvulsi (FC), juga dikenali sebagai kejang demam atau demam sawan, merupakan sawan yang paling sering terjadi pada kanak-kanak selepas satu bulan. Kebanyakan ibu bapa berasa panik apabila menyaksikan kekejangan demam berlaku pada anak mereka. **Tujuan:** Untuk meneroka tahap pengetahuan, sikap, keprihatinan, dan amalan (KACP) ibu bapa berkenaan terhadap demam sawan di Hospital Universiti Sains Malaysia. **Kaedah:** Penyelidikan *cross-sectional* yang dilakukan selama tempoh dua bulan dengan 55 responden yang memenuhi kriteria kajian telah dipilih. Tahap KACP ibu bapa diukur dengan menggunakan soalan *FC parental KACP*. Analisis statistik yang digunakan adalah deskriptif, *independent t-test, Pearson's correlation*, dan *one-way ANOVA test*. **Keputusan:** Skor pengetahuan responden tentang FC tidak begitu memuaskan dengan niali rata-rata skor pengetahuan hanya 3.18±1.71. Jumlah skor sikap adalah 25.2±8.28, keprihatinan adalah 37.4±6.06, dan amalan adalah 6.51±1.47. Kekurangan pengetahuan menyebabkan ibu bapa selalu mempunyai kebimbangan yang sangat tinggi, sikap negatif dan amalan sederhana terhadap anak-anak mereka dan ini terbukti oleh keputusan yang signifikan selepas diuji dengan *Pearson's correlation* (P=0.002). Kebimbangan yang paling umum adalah kecederaan otak (87.3%), FC boleh berkembang (83.7%) dan anak mungkin mati semasa kekejangan (45.5%). Penemuan kajian juga mendapati bahawa tidak ada perkaitan antara faktor demografi dengan

KACP ibu bapa terhadap FC (P> 0.05). **Kesimpulan:** Kajian ini dapat menyimpulkan bahawa ada keperluan untuk memberikan kesedaran yang lebih tinggi di kalangan ibu bapa untuk meningkatkan pengetahuan mereka dalam penjagaan anak yang ada FC. Peningkatan pengetahuan dapat membantu ibu bapa dalam menangani FC dan menghilangkan ketakutan apabila menyaksikan anak mereka mengalami episod FC yang akut.

CHAPTER 1

INTRODUCTION

1.1 Background of The Study

Febrile convulsions (FCs), also known as a fever fits or febrile seizures, are the most common seizure disorder that occurs in childhood after age one month. It is associated with a febrile illness not caused by an infection of the central nervous system, without previous neonatal seizures or previous unprovoked seizures and not meeting the criteria for other acute symptomatic seizures. Therefore, they are considered benign and have a normal cognitive outcome (Sadleir & Scheffer, 2007). According to the American Academy of Pediatrics (AAP) and its Provisional Committee on Quality Improvement (1999), FCs occur in infants and children between six months and six years of age while the peak occurrence is at 18 months. Generally FCs can be further divided into simple and complex febrile seizures (Waruiru & Appleton, 2004).

According to Mahmoud Mohammadi (2010), FCs are the most common form of convulsive phenomenon in human being and affected 2% to 14% of children. It is the most benign type of all seizures occuring in childhood. Although the occurrence of FCs in childhood is quite common, parents at the time who witnessed the

conditions of FC can be extremely frightened, emotionally upset and anxious (Parmar, Sahu & Bavdekar, 2001). This is because the condition of FC is very scary to the parents. For example the child may have a fit in the arms and then become very floppy and stop breathing. Their eyes might go up-rolling and it may extremely scare the parents. Therefore, parents are usually shocked to see their child experience a seizure and may perceive that their child is dying (Jones & Jacobsen, 2007). In a study of parental knowledge and practices regarding FCs in Turkish children which was conducted by Kayserl, Unalp, Apa, Aslsoy, Hizarciolu, Gulez, & Ain (2008), they found that parents generally believed that FC is a life-threatening event and that electroencephalogram (EEG) and computed tomography (CT) scan were necessary. Approximately half of the parents did not know what to do during a FC episode. They might use anything to manage the condition, especially those parents who witnessed the FC for the first time. The daily life of parents is also negatively affected by FC, with parents frequently waking at night to follow their children's temperature (Kurugol, Tutuncuoglu & Tekgul, 1995).

Furthermore, most parents considered it important to have accurate information about fever, common childhood illnesses, signs and symptoms of illness and managing a febrile child, for all parents, particularly new parents. Perceptions of the ideal time to receive information were mixed. Some parents recommended during

antenatal classes, others recommended post-delivery, before the first febrile illness, from a doctor or child health nurse at a well-baby visit or with the first immunisation (Walsh, Edwards & Wilson, 2007). As a result, families with children afflicted with FCs should be given adequate information regarding seizures and fever. Besides, they also need emotional support and first-aid demonstrations to increase their confidence in taking care of their children (Farsar & Kolahi, 2008).

Observing a seizure may be one of life's most frightening experiences. Many parents who witness a child's first seizure think the child is dying. Their lack of knowledge and sense of helplessness may be compounded by misconceptions about the risks of swallowing the tongue, choking, brain damage, mental retardation, and death. The thousands of parents each year who are terrified by such an event are in need of good information and reassurance (Freeman, 1992). Therefore, it is important that health care providers understand potential parental misconceptions, anxieties and fears about fever and FCs so that they may reduce those fears effectively (Kayserl, et al., 2008). The healthcare provider needs to assess parental reactions to the occurrence of FC and to determine the coping patterns utilized as well as to detect any disruptions in parent-child interactions (Jones & Jacobsen, 2007).

1.2 Problem Statement

FCs are the frequent cause of emergency hospital admissions in childhood with a 2–5% prevalence and approximately 30% rate of recurrence (Huang, Huang & Thomas, 2006). Each year, about 150,000 children and adolescents in the United States will come to medical attention for evaluation of a newly occurring seizure disorder of some type (Daoud, 2004). A similar rate of FCs is found in Western Europe. The incidence elsewhere in the world varies between 5% and 10% for India, 8.8% for Japan, 14% for Guam, 0.35% for Hong Kong, and 0.5-1.5% for China (Chung & Wong , 2007).

For the South East Asian countries, only Singapore has estimations of prevalence of the illness. Based on a study of 30,754 children born in two public hospitals in Singapore, there are estimations on cumulative incidence of FC by 6 years to be 4.47% overall, 5.14% in male, and 3.0% in female (Lee & Ong, 2004). This falls in the range of 2% - 5% reported elsewhere, but higher rates have been reported in Japan. While there were no significant differences in rates between the three racial groups, Chinese, Malays and Indians (Tan & Lim, 1997).

Admission of children into a general pediatric ward due to FC is very common in Malaysia. In study of Deng, Zulkifli & Azizi (1994), the researchers set out to look prospectively into the clinical and epidemiological features of these Malaysian

children with FC. They reported that the first FC occurred before the age of three years in 92.9% of 177 children in the study. Meanwhile the highest number of FCs was in the six to twelve months age group. The average length of seizure was 9.5 minutes and the majority was non-recurrent.

In pediatric ward of Hospital Universiti Sains Malaysia (HUSM), Kelantan, Malaysia, there had been a total of 98 admissions of febrile seizure cases among 210 children of seizure in year 2008, 94 cases of febrile seizure among 201 children of seizure in year 2009, and 111 cases of febrile seizure among 324 children of seizure in year 2010 (*Unit Rekod Perubatan* HUSM, 2010).

Parents nowadays especially those who just became parents might not know what exactly FC is. Because FCs still continuously happen, therefore there is a need for an on-going research to assess what parental thoughts are regarding FC. The immediate parental responses to the occurrence of FC have been addressed by several articles, such as in Taiwan, Turkey, United Kingdom, Australia, and India (Huang, Liu, Huang & Thomas, 2002). However, it is rarely found in Malaysia. In Turkey, the researchers found that families with children with FC admitted several times to hospital still lacked adequate knowledge regarding FC. They had concerns regarding the child's health and they were not conducting optimum first-aid practices (Kayserl, et al., 2008). Therefore, parental knowledge, attitude, concern and practice (KACP)

have to be assessed and measured to determine the level and further intervention can be developed to help parents and children with FC.

1.2.1 Theoretical or Conceptual Framework

The conceptual which provide support for this research is social cognitive theory (SCT). SCT of perception is the view that parental knowledge and attitudes can be improved by providing information. While parental behavior capacity and self-efficacy can be developed by providing emotional arousal, behavioral practice and rehearsal. These effects might reduce parental concerns and increase their competence in dealing with FCs (Huang, Liu, Chi, et al., 2002). SCT is an agent-centered approach to understanding human action, though, motivation, and emotion (Maddux, 1995). SCT also encompasses self-efficacy and its effects on motivation, effort, persistence, and performance.

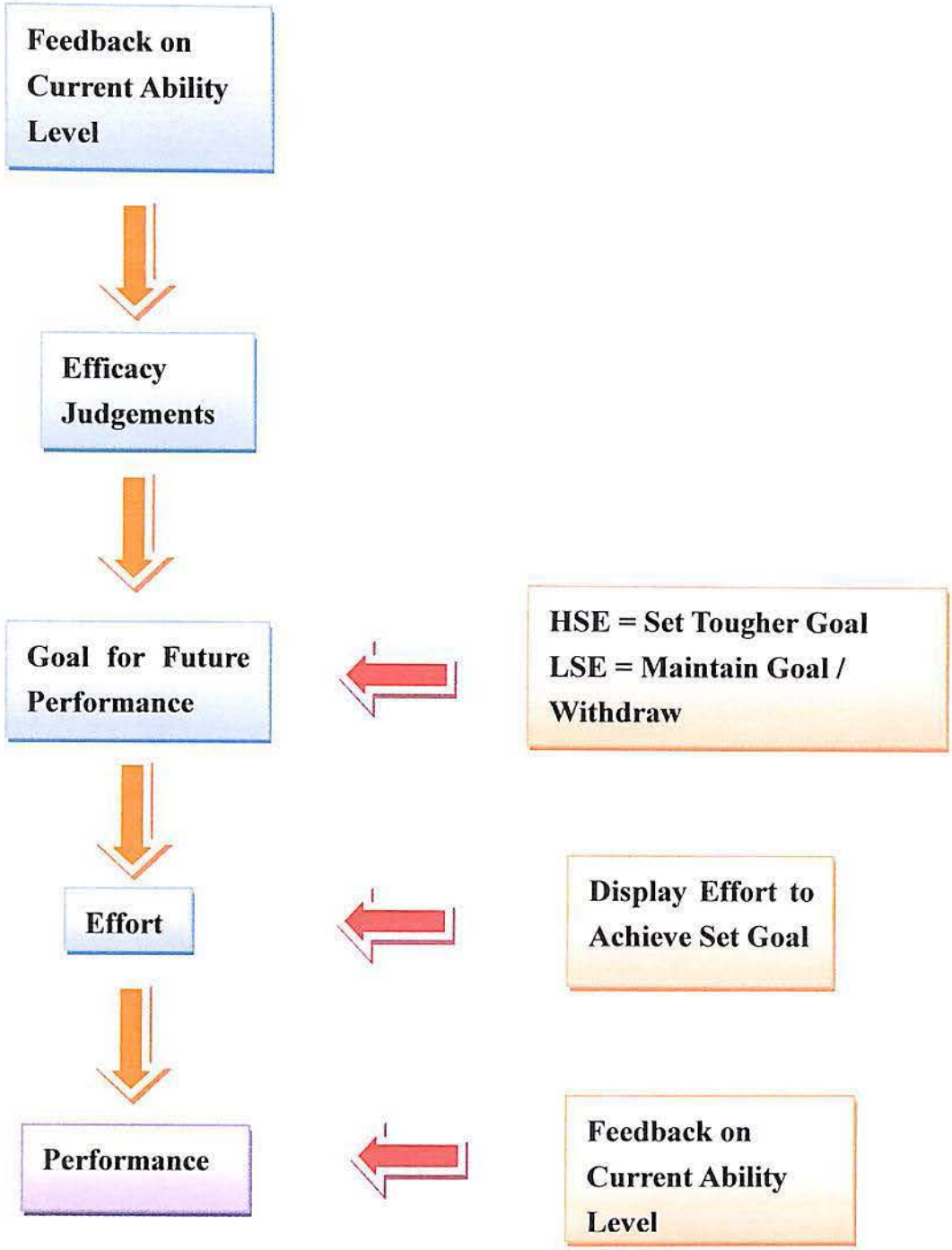

Figure 1.2 Conceptual Model of Social Cognitive Theory (Bandura, 2001, 2002).
Note: HSE = High Self-efficacy; LSE = Low Self-efficacy

1.3 Objective of the Study

The general objective of this study is to investigate the parental knowledge, attitude, concern, and practice towards febrile convulsion in Hospital Universiti Sains Malaysia (HUSM).

1.3.1 Specific Objectives

1. To identify parental knowledge level about febrile convulsion.
2. To explore parental attitude toward febrile convulsion.
3. To identify parental concern level about febrile convulsion.
4. To explore parental practice toward febrile convulsion.
5. To determine the association of knowledge with attitude, concern and practice among parents toward febrile convulsion.
6. To determine the association of demographic factors with knowledge, attitude, concern, and practice (KACP) among parents toward febrile convulsion.

1.4 Research Question

1. What is the parental knowledge level about febrile convulsion?
2. What is the parental attitude about febrile convulsion?
3. What is the parental concern level about febrile convulsion?

4. What are the parental practices of their children's febrile convulsions?
5. Is there any association between knowledge with attitude, concern and practice of parents toward febrile convulsion?
6. Is there any association between demographic factors with knowledge, attitude, concern, and practice of parents toward febrile convulsion?

1.5 Hypothesis

a) **Ho:** There is no association between parental knowledge level about febrile convulsion and their attitude, concern and practice.

Ha: There is a association between parental knowledge level about febrile convulsion and their attitude, concern and practice.

b) **Ho:** There are no associations between demographic factors with knowledge, attitude, concern, and practice of parents toward febrile convulsion.

Ha: There are associations between demographic factors with knowledge, attitude, concern, and practice of parents toward febrile convulsion.

At the 5% level of significant, the Ho is rejected of P> a (0.05).

1.6 Definition of Terms

1.6.1 Febrile convulsion

A febrile convulsion is defined as a seizure that occurs in childhood after age one month, associated with a febrile illness not caused by an infection of the central nervous system, without previous neonatal seizures or previous unprovoked seizures and not meeting the criteria for other acute symptomatic seizures (The International League against epilepsy, 1993, cited from Pathirage, 2010).

1.6.2 Fever

Children have higher metabolic rates and smaller surface area than adults and therefore higher temperatures (Walsh, 2008). Fever, determined through behavioural changes, was perceived as 'good', a warning something was wrong. High fever, reported as 38.0°C to 39.1°C, was considered harmful; it must be prevented or reduced irrespective of concerns about antipyretics (Walsh, Edwards & Wilson, 2007). Childhood fever was defined as 37.2°C axillary, 37.8°C orally and 38.0°C by tympanic or rectal methods (Leonard & Jeffrey, 2005).

Previously, following a systematic literature review, a range of temperatures were reported to indicate childhood fever: oral 37.6° to 37.8°C and rectal 38.0°C to 38.3°C (Watts, Robertson & Thomas, 2003). Literature definitions of fever include 40.0°C as moderate fever; 40.5°C high fever and 41.7°C dangerous fever

(with associated brain damage). These sources make it possible to identify a range of temperatures for children: normal temperature 36.0°C to 37.9°C, mild fever 38.0°C to 39.0°C, moderate fever 39.1°C to 40.4°C and high fever above 40.5°C (Lorin, 1999).

1.6.3 Parental knowledge

The term knowledge is defined as the skills or expertise acquired by an individual through the process of education or experience, which involves both theoretical and practical knowledge, learning of the facts and information available about a particular field or in total and awareness gained from a particular situation or fact. The term "parent" includes in addition to a natural parent, a legal guardian or other person standing in *loco parentis*, such as a grandparent or stepparent with whom the child lives, or a person who is legally responsible for the child's welfare (Patel, Thakkar, Swaminarayan & Sajja, 2010).

1.6.3 Epileptic Disorders

An epileptic seizure is a clinical event, presumed to result from an abnormal, paroxysmal and excessive discharge of a set of neurons in the brain. The clinical manifestation consists of sudden abnormal and transitory phenomena in relation to the cortical zones affected by the discharge. Such changes include distortion of awareness, motor, sensory, autonomic or mental events, perceived by the patient

or an observer, with or without loss of consciousness. While e*pilepsy* is defined as a condition characterized by two or more recurrent epileptic seizures unprovoked by any immediately identified cause (Jallon, 2002).

1.7 Significance of the Study

Many studies have investigated the etiology and natural history of FCs and evaluated various management strategies, but very little information is available about parental KACP (Huang, Huang & Thomas, 2006). Therefore, a quick assessment tool for obtaining information about parental responses to FCs is essential for educating parents and for use in clinical practice and research (Huang, Liu & Huang, 1998). The significance of study is to reduce harm of FCs on children, to reduce parental anxiety toward FC by increasing their knowledge and practice, to improve quality of life of children with FC and parents, to generate awareness among health care providers to assess and provide health education to help those parents, and to increase awareness of public toward FCs.

This research is so important for children who have FC, parents or families of children who have FC, young generations who are going to become parents, health care providers and public. Through this research, the questionnaire from Huang, Huang and Thomas, 2006, in their study "Febrile Convulsions: Development and

Validation of a Questionnaire to Measure Parental Knowledge, Attitudes, Concerns and Practices" will be used. The KACP of families in the matter of FCs will be measured and evaluated. Furthermore, the efficiency of parental first-aid practices can be evaluated and significant improvement can be achieved by giving adequate information to the parents. These can reduce the harms or side effects of infants or children suffering from FCs that are being caused by fever. Furthermore, this study will encourage parents to play their role by learning about FCs and monitor their children's health status especially fever.

FCs is emotionally traumatic for parents. To help parents cope with their children's FCs, it is essential to reduce parental concerns and improve their responses to seizures at home (Ofovwe, Ibadin, Ofovwe & Okolo, 2002). Accordingly Huang, Liu, Chi, et al. in their studies "Effects of educational intervention on changing parental practices for recurrent febrile convulsions in Taiwan (2002)" reviewed that understanding and improving parental KACP toward FCs are essential. Besides that, this study able to encourage more researchers to find the ways in order to provide the best management for FC. The public also will be educated regarding febrile convulsion and awareness of the society will be increased to promote safety and prevent harms on children with FC.

As normal reactions, parents will bring their children immediately to hospital

once their children have seizure, especially when it is the first occurence. Usually this kind of parents have the highest anxiety level. Some of them will treat their children at home by bringing down the fever as fast as possible with medication. While some of them, will take wrong emergency action to their children. Some parents can do well to manage their children such as supporting them and reducing their anxiety. But some cases showed that some parents do not know at all. They try to do things such as finding a *bomoh* (traditional healer), putting a shoe into the child's mouth, cardiac massage, etc. This type of parents do not understand the fact and may complicate the situation and harm their children. These can bring permanent effect to the children, physically and psychologically. If this study not carry out, it is impossible to achieve the objectives of this study. Parents will continuously anxious, and/or using wrong practice to their children with FCs. Quality of life of parents and children also will be affected. The problem will continue to rise, as well as the medical cost and rate of admission to hospital. Health care providers also do not aware of the importance of health education for parents.

The best treatment for FC should involve establishment of a good communication with parents. Health professionals must have better understanding in behaviors of parents whose children have FC to ensure appropriate care (Huang, Huang & Thomas, 2006). It is important that the families are relieved of their

concerns and are capable of intervening optimally with the disease. The health workers have to teach and comfort parents so that their psychology status is well. Encourage the health care providers to assess level of KACP will also reduce parents' anxiety, and enable them to treat their children as normal children.

Some researchers noted that although parents who have children with recurrent FCs had more information and better practice, they had increasing concerns and still tended to believe in folk medicine (Kayserl, et al., 2008). Although FC is a common neurological and emergent problem in pediatric practice, but it has serious effects on parents. Giving adequate information about FC and its prognosis would be helpful in alleviating parental stress. Besides that, any spoken or written information that correctly evaluates body temperature can be given to the parents. Taking the appropriate measures to relieve the fever would contribute to decrease in the morbidity of FC (Kurugol, Tutuncuoglu & Tekgul, 1995). Educating right knowledge, right attitude, right concern and right practices to parents are important.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Seizures that occur at the time of high fever are known as febrile convulsions (FCs) or febrile seizures. These FCs are commonly seen in children between 6 months to 6 years and are generally benign outcome (Sadleir & Scheffer, 2007). Generally FCs occur with high fever, usually at temperature more than 40°C, but may also be seen at lower temperature when there is a sudden rise in body temperature. These fits usually last for 1 to 10 minutes. Fever itself is not harmful, has a natural upper limit and convulsions resulting from fever are benign (Chang, Guo, Wang, Huang & Tsai, 2001). Simple FCs that occur in children are common events with few adverse outcomes. Those who advocate therapy for this disorder have been concerned that such seizures lead to additional febrile seizures, to epilepsy, and perhaps even to brain injury. Moreover, they note the potential for such seizures to cause parental anxiety (Baumann, 1999).

Although FC does not cause death, brain damage, or learning disorders, but it is quite frightening to caregivers. Witnessing a child's seizure is a panic experience for the parents and the memory of it is never lost. The seizure may have an effect on family life, with parents measuring children's temperature frequently, remaining

awake at night, or allowing the child to sleep in their bedroom in case the child has another seizure. In addition, parents' adverse reactions can persist for several months after the FC (Huang, Liu, Chi, Huang & Cain, 2001). In fact, school-aged children with a history of FC demonstrated significantly less distractibility, better attention spans, better mnemonic capacity, more flexible mental processing, and higher impulsivity than their age-matched peers (Chang, Guo, Wang, et al., 2001).

A research from Ling (2002), Kuala Lumpur, Malaysia, found that the majority of parents were frightened or were in a panic state on witnessing FC in their children. Parental understanding on FC was deficient, particularly with regard to home management of acute seizures. The parents' main source of information was friends and relatives. Therefore, urgent intervention to counsel and alleviate parent's fear is required. More effort must be made to educate parents about FC, with particular reference to home management of FCs. This study intended to determine the parental response towards febrile convulsion in children and their understanding of home management of FC.

2.2 Parental Responses toward Febrile Convulsion

2.2.1 Types of Febrile Convulsion

Based on clinical characteristics, there are two major types of FCs, there are simple and complex. Simple FCs (typical) consist of a brief convulsion which lasting

less than 10 minutes. Usually it generalized, and occurs only once within a 24-hour period (Baumann, 1999). There is no focal features and it resolves spontaneously. Conversely, complex FCs (atypical) are multiple and prolonged longer than 10-15 minutes. It occurs more than once during the febrile illness over a 24-hour period and showing focal features (Karande, 2007). Fortunately to say, the majority of FCs are simple (70-75%) and only 9-35% of FCs are complex (Waruiru & Appleton, 2004).

2.2.2 Prevalence and Incidence

FCs are the most common and benign convulsive disorder among children. They are slightly more in males (Daoud, 2004). Variation in prevalence relates to differences in case definitions, ascertainment methods, geographical variation, and cultural factors (Kurugol, Tutuncuoglu & Tekgul, 1995). Between 2% and 4% of all children in Europe and the United States experience at least one convulsion associated with a febrile illness before the age of 5 years (American Academy of Pediatrics, 1996, cited in Daoud, 2004). The cumulative incidence of febrile convulsions among children ranges from about 1% in China to more than 8% in Japan and 14% in Guam (Chan, Cherk, Chan, Ng & Ho, 2007). While in a British birth cohort, 2.7% of children had febrile seizures, 88% of whom had simple febrile seizures (Baumann, 1999).

In a Danish population based twin study of genetic and environmental factors in FCs, the researchers found that the prevalence of FC ranges between 3% and 8% in children up to 7 years of age (Kjeldsen, Kyvik, Friis & Christensen, 2002). In North America, the incidence of FC is between 2-5% (Joshi, Wawrykow, Patrick & Prasad, 2005) with at least 3% to 4% of all children experiencing at least one FC before the age of 5 years (Gordon, Camfield, Camfield, Dooley & Bethune, 2000). Few children will have a first episode after 3 years. It has been found that 21% children had a convulsion either before or within one hour of onset of fever, 57% between 1-24 hours after onset of fever and 22% had a convulsion more than 24 hours after onset of fever (Daoud, 2004).

2.2.3 Risk Factor and Risk of Recurrence

As to gender, FC occurs more often in boys than in girls (Rosman, 2001). On a study result, researchers found out that significant independent risk factors were height of temperature and history of FCs in a higher degree relative (Berg, Shinnar, Shapiro, Salomon, Crain & Hauser, 1995). Gastroenteritis as the underlying illness had a significant inverse association with FCs. While maternal smoking during pregnancy was a marginally significant predictor of FCs. Whereas the risk factors associated with a complex first febrile convulsion were age of 15 months or less, birth weight of 2 kg or less, and initial temperature of less than 38°C (Ling, 2001).

A child who has experienced a single simple FCs is likely to experience another. The likelihood of a recurrence of FC varies with age. As epidemiologic data indicate, the younger the child at the first FC, the more likely is a recurrence (Baumann, 1999). According to Karende (2007), recurrence rate of FC after the first episode is 30%; half of the convulsions recur in the first 6 months, three-quarters within a year, and 90% within 2 years. Children with a first or second-degree relative with FC and developmental delay have 28% chances of experiencing at least one FC. Approximately 30% of children with one FC will have a recurrence, 10% will have 3 or more episodes (Ofovwe, Ibadin, Ofovwe, et al., 2002).

Factors increasing the risk of recurrence are a family history of FC, age of first attack younger than 12 months, and the height and duration of the fever. Previous studies have shown an increase risk of recurrence to be associated with shorter duration of fever before the initial FC and a lower temperature (Daoud, 2004). There are four major risk factors were identified in a review for family physicians for recurrence of FCs in Indians. There include young age at onset (<18 months), family history of FCs or epilepsy in a first- or second-degree relative, a low temperature at the initial FC, and complex initial FCs occurring during the first episode. It should be remembered that an episode of fever is, in fact, the only time that the child is at risk of recurrence (Karende, 2007).

2.2.4 Etiology and Causes

Fever itself is the cause of convulsions. Fever may be due to any infection in any part of the body. However, children with seizures due to a central nervous system (CNS) infection, a previous afebrile seizure, or an underlying CNS abnormality are excluded in FCs. At the time of convulsions, 75% of patients had a temperature over 39 °C (Shinnar & Glauser, 2002). Even though, the definitive degree of fever is uncertain for different cases. According to Daoud (2004) in the review and update of FC, the exact role of fever in the etiology of FC is not clear but there are 7-31% of cases belongs to positive family history.

Viruses are the most common cause of illnesses in children admitted to hospital with a first FC with reported correlations to specific viruses like herpes and influenzae (Okumura, Takemoto & Ozaki, 2003). Upper respiratory tract infection was the most common cause of fever in children (Deng, Zulkifli & Azizi, 1994). Serum and CSF zinc levels are decreased in children with FC, and zinc deprivation may play a role in the pathogenesis of FC. Iron deficiency anemia has been found to be commoner in children with FC than controls and may also be related to FC (Daoud, Batieha, Ekteish, Gharaibeh, Ajlouni & Hijazi, 2002). Caksen, Oner, Arslan, Kan, Cesur & Uner (2001) have reported an immunoglobulin deficiency in FC, which may be of significance in causing of FC or the fever. Others have reported a possible

immunological derangement in the cytokines and interferon axis in FC that may correlate with the pathogenesis of FC or at the fever (Virta, Hurme & Helminen, 2002).

2.2.5 Complications of Febrile Convulsion

FCs are usually harmless and do not cause any brain damage unless in few exceptional cases the fit is unusually prolonged. Children with FCs encounter little risk of mortality and morbidity. Knudsen (2000) in study of treatment and prognosis of FC reported that there is no evidence to suggest that FCs cause any lasting damage, such as brain damage, learning difficulties or premature death. Previous studies also stated that FCs rarely have association with detectable brain damage (Jones & Jacobsen, 2007).

A single simple FC does not seem to increase the risk of epilepsy and there is no causal relationship between FC and subsequent epilepsy (Daoud, 2004). However, a minority of children who have FCs will go on to develop epilepsy (Shinnar & Glauser, 2002). These are associated with the recurrence of FCs or a complex first FC (MacDonald, Johnson, Sander & Shorvon, 1999). The risk of child developing epilepsy after simple FC or complex FC is 1.0-2.4% and 4.1-6%, respectively (Sapir, Leitner, Harel & Kramer, 2000). However, if the child who experienced multiple simple seizures was under 12 months of age when they had their first seizure, the risk

rises to 2.5%. Children with underlying factors such as neurological abnormalities, or a developmental delay before the onset of febrile seizures, a family history of epilepsy, a short duration of fever (less than one hour) before the seizure, and complex seizures will increase the risk of developing epilepsy (Shinnar & Glauser, 2002). For patients with childhood FCs, Lee & Ong (2004) estimated the cumulative risk for afebrile seizure 5 years later to be 1.5%, confirming the benign nature of the disease.

In addition, proponents of therapy for simple FCs have worried that repeated simple FCs will lead to more FCs and epilepsy. The seizures will cause brain injury and thus diminish intelligence or impair motor coordination (Baumann, 1999). In Ling (2001) studies, she found that among those who would have FC, up to 20 - 35% of them would develop complex FCs. While risk of acute neurological abnormality increased with increasing duration of seizure. Complex FC had been shown to be related to subsequent epilepsy. In addition, previous studies also reported that complex FC was associated with increased mortality and long-term neurological deficits (Waruiru & Appleton, 2004).

2.2.6 Treatment and Emergency Action

Since fever is the cause of convulsions, the most important part is to bring down the child's fever as quickly as possible. This will shorten the seizure duration. If fever still rises, tepid sponging with cold water will keep the body temperature under

control. Paracetamol and ibuprofen are often useful in relieving the discomfort of a febrile child. However, rigorous attempts to reduce the temperature with these drugs should not be recommended, as no evidence exists that this decreases recurrence of FC (McIntyre, Robertson, Norris, et al., 2005).

The recent practice parameter of the American Academy of Pediatrics has recommended against either continuous or intermittent anticonvulsant therapy for children with one or more simple FC. Although antiepileptic drugs can prevent recurrent febrile seizures, they do not alter the risk of subsequent epilepsy (Shinnar & Glauser, 2002). Where a seizure continues for more than five minutes, an ambulance should be called. Immediate management for FCs such as rectal diazepam (0.5 mg/kg) and buccal (0.4-0.5 mg/kg) or intranasal (0.2 mg/kg) midazolam are effective and can be administered at home for a seizure lasting longer than five minutes (Bhattacharyya, Kalra & Gulati, 2006). If the seizure is not aborted after another 10 minutes, the larger jerking has stopped but the child has ongoing twitching, or another seizure begins before the child returns to normal conscious status, an ambulance should be called.

Ultimately, recommendations for such treatment hinge on the issue of prevention of parental anxiety and family disruption, among other issues. Actually one of the most cited reasons for physicians initiating medication management is parental anxiety (Gordon, Dooley, Camfield, Camfield & Sween, 2001). Generalists