

**NOCTURNAL ENURESIS AMONG
KINDERGARTEN-AGED CHILDREN IN KUBANG
KERIAN, KELANTAN**

by

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**Dissertation submitted in partial fulfilment of the
requirements for the degree of
Bachelor of Health Sciences (Nursing)**

June 2014

DECLARATION

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.



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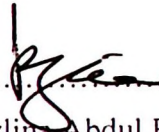
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LIST OF ABBREVIATIONS

NE	Nocturnal Enuresis
DE	Diurnal Enuresis
PNE	Primary Nocturnal Enuresis
SNE	Secondary Nocturnal Enuresis
UTI	Urinary Tract Infection
WHO	World Health Organization
NHC	Nursing Health Center
SPSS	Statistical Package for Social Science

NOCTURNAL ENURESIS AMONG KINDERGARTEN-AGED CHILDREN IN KUBANG KERIAN, KELANTAN

ABSTRACT

Nocturnal enuresis (NE) is the second most chronic health problem in children and it also can lead to socially disruptive and stressful condition. The aim of the present study was to identify the prevalence, associated risk factors, parents strategies to overcome NE and parents health seeking behavior for child's NE. A cross sectional survey study was conducted on 70 children aged between five to six years old at four kindergarten in Kubang Kerian, Kelantan. Participant in this study was selected through simple random sampling method. The association between selected socio-demographic characteristics (age, gender, and number of siblings) and Nocturnal Enuresis were analyzed using chi-square test and STATA. The association between school performance (social, academic and physical) and Nocturnal Enuresis also was tested. The overall prevalence of Nocturnal Enuresis was 47.1%. The associated risk factors for Nocturnal Enuresis were positive family history, problem during birth, hyperactivity of the child, urinate in pants during a day, constipation and urinary tract infection. Most 45.7% of parents had woke their child up to urinate as a strategy to overcome NE. All parents had not seek treatment for child with NE. A significant association was found between number of siblings and nocturnal enuresis ($p= 0.024$). A significant association was also indicated between school performance (social, academic and physical) and nocturnal enuresis ($p<0.05$). Identification of children at risk is an essential step before choosing the individualized management for child's NE. The parents also must seek appropriate treatment from health professional and applied the suitable strategies to overcome child's NE.

KENCING MALAM DALAM KANAK-KANAK TADIKA DI KUBANG KERIAN, KELANTAN

ABSTRAK

Kencing malam adalah penyakit yang kedua paling kronik dalam kalangan kanak-kanak dan ia juga boleh menyebabkan gangguan sosial dan keadaan yang sangat tertekan. Kajian ini adalah bertujuan untuk mengenalpasti prevalen, faktor-faktor risiko yang berkaitan, strategi ibu bapa dalam menangani kencing malam dan tabiat mencari rawatan ibu bapa untuk kanak-kanak kencing malam. Kajian secara keratan lintang telah dijalankan dalam kalangan 70 orang kanak-kanak berumur antara lima hingga enam tahun di empat tadika Kubang Kerian, Kelantan. Peserta dalam kajian ini telah dipilih melalui persampelan secara rawak. Perkaitan antara ciri-ciri sosio-demografi terpilih (umur, jantina dan bilangan adik beradik) dan kencing malam telah dianalisis menggunakan chi-square dan STATA. Perkaitan antara prestasi di sekolah (sosial, akademik dan fizikal) dan kencing malam juga telah dikaji. Keseluruhan prevalens kencing malam adalah 47.1%. Faktor-faktor yang berkaitan dengan kencing malam adalah sejarah keluarga yang positif, masalah semasa lahir, keaktifan kanak-kanak, kencing di seluar dalam pada siang hari, sembelit, dan jangkitan salur kencing. Kebanyakan (45.7%) ibu bapa membangunkan anak mereka untuk kencing sebagai strategi untuk menangani kencing malam. Semua ibu bapa tidak mendapatkan rawatan untuk kanak-kanak kencing malam. Terdapat perkaitan dijumpai di antara bilangan adik-beradik dan kencing malam ($p=0.025$). Perkaitan antara prestasi di sekolah (sosial, akademik dan fizikal) dan kencing malam juga dikenalpasti ($p<0.05$). Pengenalpastian kanak-kanak yang berisiko adalah merupakan langkah utama sebelum pemilihan pengurusan secara individu kanak-kanak kencing malam. Ibu bapa juga haruslah berjumpa ahli kesihatan profesional dan mengaplikasi strategi yang sesuai bagi menangani kanak-kanak kencing malam.

CHAPTER 1:

INTRODUCTION

1.1 Background of the study

Enuresis is a repeated involuntary or unintentional voiding. Approximately 5 million of children suffers enuresis (Gur et al., 2004). According to Radunovich & Evans (2003), enuresis can be divided into two types; Diurnal Enuresis (DE) - (wetting that occurs during day time) and Nocturnal Enuresis (NE) - (wetting that occurs during night sleep). However, for the purpose of this study, the researcher decided to focus mainly on NE. Nocturnal enuresis happen at night but diurnal enuresis happens during the day. Instead, when it occurs during both the day and the night, it is known as mixed enuresis (Triantafyllidis et al., 2005). Among these two, NE was the common type of enuresis occurs in children.

Nocturnal Enuresis is acknowledged as the second most chronic health problem in children. It was also known as bedwetting and was a socially disruptive and stressful condition, which affects around 15 to 20 percent of five-years old and towards two percent of young adults (Glazener, Evan & Peto. 2008). Moreover, this health problem can be divided into primary NE and secondary NE. Primary NE was bedwetting in children of aged 5 years or above who had never been dry for an extended periods. While secondary NE was the onset of bedwetting after a continuous dry period of more than 6-12 months (Gunes, Gunes, Achik & Akilli, 2009).

Some of the symptoms of NE include urgency, increased daytime frequency and urge urinary incontinence (Kajiwara et al., 2006). Children with NE may also experience wetness during daytime (urinary incontinence) with the symptoms of sudden, urgent and frequent need to pee, or needing to pee infrequently (usually less than four times a day). They may also having pain and had to strain during passing urine, constipation and feel very thirsty all the time (Nursing Health Center [NHC], 2013).

Although NE was prevalent among younger age children, the prevalence however, decreases with the increasing of age, whereby about 15 percent of children will spontaneously achieve nighttime bladder control annually (Sureshkumar, Jones, Caldwell & Craig, 2009). A longitudinal study by Karim Eldin et al., (2013) in the United Kingdom reported that the prevalence rate of NE was 30 percent in those less than 4.5 years old. They indicated that the prevalence however, declined to 9.5 percent when they reach 9.5 years old.

Surprisingly, NE among children was significantly associated with family history. This is supported by Karim Eldin et al., (2013) that the risk for NE increases between 43 percent to 77 percent in a child of parents who had history of NE. It is also depending on whether one or both parents were affected whereby NE is more significant if both parent had positive history of NE. There are several complications of NE include embarrassment, inferiority and anxiety, loss of self-esteem, and negative effects on self perception, interpersonal relationship and school performance (Paul, Alikor & Anochie, 2012). Most parents expressed burdens with their child's NE and some of them feeling under stress and become annoyed and intolerant. As it is a burden to most parents, they could not avoid to adopt various strategies to help their child to stay dry during the night. This include wake them up to void, fluid restriction, star charts, reward charts, wait for maturity, talk to the child about NE, asked the child to change bed linen, using alarm, medication and punishment (Butler, Golding & Heron, 2005).

1.2 Problem Statement

Prevalence rate of NE was reported as higher in children aged 5 to 16 years that were 4 to 40 percent (Ni, 2012). In terms of gender, NE is common and the symptoms is prolong in boys than in girls. In contrast to this, a few studies also found that NE was higher in girl due to stressful condition experienced by those of lower economic background. Besides, the prevalence also was high in those with positive family history of NE (Karim Eldin et al., 2013).

Prevalence rate of NE may also be influenced by the misconceptions among most parents that NE is not a health problem. It was reported that parents sought treatment for their child's NE only when the problem persists. The parents preferred to deal with NE

themselves or wait until the problem worsen rather than seek early treatment. Thus, it can be assumed that the prevalence may be higher than the reported rate.

The researcher believed that limited knowledge regarding NE and the availability of treatment for NE has further led to this misconceptions among parents (Osungbade & Oshiname, 2003). Accordingly, this health problem also was not openly discussed. Hence, this problem will continuously be underlooked and untreated.

There were many studies on NE conducted in many countries such as Turkey, the United Kingdom, and Africa (Sureshkumar, Jones, Cumming, & Craig, 2009). Such study however is scarce in Malaysia recently. The researcher only managed to find one published study conducted in Malaysia by Kanaheswari (2003) and also one unpublished undergraduate study by Najwa (2010). Although these two studies focused on the prevalence and parents perceptions toward NE, the study however, did not cover its impact on school performance.

All of the above issues inspired the researcher to conduct this study by covering the issues of prevalence and perception as well as other issues including strategies, health seeking behavior and impact on school performance with the hope to add new knowledge to this area of care. Besides prevalence, the propose study will also determine parents' strategies to cope with their child's NE and their treatment seeking behavior towards NE.

This study had been utilized the Health Believe Model (HBM) to help explain relationships between socio-demographic data that may influence parents' health seeking behavior for their child's NE. The HBM is a suitable model for adressing problem behaviors that evoke health concerns (Croyle, 2005) and also was used in order to illustrate individual beliefs about the actions and maintainance of health in order to improve better health.

1.3 Research objectives

1.3.1 General Objective

The purpose of this study was to determine the phenomenon of nocturnal enuresis (NE) among kindergarten- aged children in Kubang Kerian, Kelantan.

1.3.2 Specific Objectives

- a) To determine the prevalence of NE among kindergarten-aged children in Kubang Kerian, Kelantan.
- b) To identify the associated factors of NE among kindergarten-aged children in Kubang Kerian, Kelantan.
- c) To identify the parents' strategies to cope with NE children.
- d) To determine the parent's treatment seeking behavior for their child NE
- e) To determine the association between selected socio-demographic characteristics (age, gender, and parents education level) and NE among kindergarten-aged children in Kubang Kerian, Kelantan.
- f) To determine the association between school performance (social, academic and physical) and NE among kindergarten-aged children in Kubang Kerian, Kelantan.

1.4 Research Questions

- i. What is the prevalence of NE among kindergarten-aged children in Kubang Kerian, Kelantan?
- ii. What are the associated factors for NE among kindergarten children?
- iii. What are the strategies used by parents to cope with their child's NE?
- iv. Do the parents seek treatment for their child's NE?
- v. Is there any association between selected socio-demographic characteristics (age, gender, and number of siblings) and NE among kindergarten-aged children in Kubang Kerian, Kelantan?
- vi. Is there any association between school performance (social, academic and physical) and NE among kindergarten-aged children in Kubang Kerian, Kelantan?

1.5 Hypothesis

H₀₁: There is no significant association between selected socio-demographic characteristics (age, gender, and number of siblings) and NE among kindergarten-aged children in Kubang Kerian, Kelantan.

H_{A1}: There is a significant association between selected socio-demographic characteristic (age, gender and number of siblings) and NE among kindergarten-aged children in Kubang Kerian, Kelantan.

H₀₁: There is no significant association between school performance (social, academic and physical) and NE among kindergarten-aged children in Kubang Kerian, Kelantan.

H_{A1}: There is a significant association between school performance (social, academic and physical) and NE among kindergarten-aged children in Kubang Kerian, Kelantan.

1.6 Definition of key terms

1.6.1 Enuresis

Refers to the ability to control urination, especially involuntary bed wetting.

1.6.2 Nocturnal enuresis

Nocturnal enuresis is defined as a disorder in which an involuntary voiding of urine during sleep with a severity of at least twice a week, in children aged 5 years or older, in the absence of congenital or acquired defects of the nervous system (Kaneko, 2012).

1.6.3 Kindergarten

Kindergarten means that the school or class intended for children age four to six as a prominent part of preschool education. Kindertartens generally stress the social and emotional growth of the child, encouraging self-understanding through play activities and creative expression (Merriam Webster, 2013).

1.6.4 Children

Children is defined as a young human being below the age of puberty or below the legal age of majority (Oxford Dictionaries Online, 2013). Children also can be defined as a boy or girl between birth and puberty, a childish or immature person and a person regarded as the product of an influence or environment (Collins Dictionary, 2013). This study focuses on the children aged between five to six years old who are at high risk to get NE.

1.6.5 Parent

Parent is defined as a person who is mother or father and have a child. It also is a person who brings up and care for another (Merriam Webster, 2013). The parents who have the child within five to six years old were included in this study.

1.7 Significance of the Study

Nocturnal enuresis (NE) was the one of the common health problems in children worldwide. Although NE was not life-threatening problem, it had a considerable impact on the children and their parents. It can cause distress condition and discomfort to the sufferers. Prolonged NE can cause psychological and emotional disturbance to the child, including their school performance. There were many research had been done to find its resolution particularly in the Western countries to understand and overcome the issues around NE. However, based on the researcher's field work and communications with several parents, NE was not seen as a health problem in Malaysia. Most of them thought that NE is a small problem and thus, deal with it on their own way (Kaneswari, 2003). Therefore, the study was be conducted to assess NE among children in Kubang Kerian with the intention to compare the results of the study with those reported in the previous NE studies. It is hope that this study will help improve the care management of the children with NE, increase parent's awareness about NE and encourage them to seek early treatment for their child. The findings of this study will also be used to prove the presence of public's misconceptions regarding NE.

CHAPTER 2:

LITERATURE REVIEW

2.1 Introduction

In this chapter, the reviewing was carried out on current literature related to nocturnal enuresis (NE). The literatures were included and discuss to help justify this study and determined the research design and tools required to achieve its objective. Reviews in this chapter covers the prevalence, associated factors, impact of NE on the children and family daily life activities. Parent's coping strategies and treatment seeking behaviors are also discussed.

2.2 The Normal Process of Micturition

Micturition or urination happens involuntarily in children until the age of 3 to 5 years where it is then regulated voluntarily. The neural circuitry that regulate bladder control is involves pathways at many levels of the brain, the spinal cord and the peripheral nervous system and was controlled by multiple neurotransmitters. During bladder filling, the storage reflexes are activated (organized in the spinal cord), but voiding is mediated by reflex mechanisms (organized in the brain). Then, the circuitry is allows the voiding-reflex pathway to function as a switch that was either in a completely 'off' mode (storage) or a maximally 'on' mode (voiding). However, diseases or injuries of the nervous system can cause the re-emergence of involuntary or reflex micturition and also contribute to enuresis (Fowler, Griffith & Groat, 2010).

In enuretic condition, the children's parasympathetic nervous action predominates and the bladder smooth muscle contraction becomes stronger. This condition leads to insufficient control of urination by the sphincter muscles of the urethra. So, the arising enuresis condition may not only due to the small anatomy of bladder but also causes by the uncontrolled contraction of bladder that happen before it is full (Kaneko, 2012).

2.3 The development of bladder control

Normal bladder control involves low pressure and adequate bladder volume filling and followed by a continuous detrusor muscle contraction. This condition can lead to bladder emptying and adequate relaxation of the sphincter complex (Tekgul et al., 2005). Children normally achieve bladder control at two to four years old (day time) and four to six years old (night time) similar to the development of other areas of development such as crawling, walking and talking (Department of Health & Human Services, 2013). It was reported that 10 percent of five years old children suffered bladder control issues and this rate later dropped significantly five percent when they turned to 10 years old. Many children struggled to control night time urination or NE but to some of them, it is very difficult to achieve due to an assortment of factors, including over production of urine at night and deep sleep patterns that prevent the child from recognizing the signs of a full bladder that eventually lead to enuresis (Schreiner, 2008).

2.4 Prevalence of Nocturnal Enuresis (NE) in Children

The prevalence of NE was very difficult to estimate due to the variation definitions and methods used to diagnose NE (Glazener, Evans & Peto, 2008). It is reported that 15% of children wet their bed at night when they reached at 5 years old of aged (Robson, 2009). In a study by Glazener et al., (2008), the prevalence rates of NE indicated in their study was 15 percent to 20 percent of five years old children same as study by Robson (2009), seven percents of seven year olds children, five percent of ten year olds children, two percent to three percent of 12 to 14 years old children and 1 percent to 2 percent in 15 years old children. They also found that the children wet their bed on average twice a week. They also indicated that children in residential care had higher incidence of NE (Glazener et al., 2008). Also there were 21.3% prevalence reported by Iduoriyekemwen in Edo State Nigeria among children aged 5-16 years and 25% reported by Famuyiwa among school children in Lagos (Ni, 2012). Thus, parents must aware that young children are at risk for NE (Amen & Ferrer, 2004).

In terms of gender and age group, a recent study by Paul, Alikor & Anochie (2012) reported that NE was highly prevalent in males and in the younger age group. Similar to Glazener et al., (2008), their study also revealed that the prevalence rate decreased as the age increased. The authors argued that the higher prevalence in male children was due to delayed functional maturation of central nervous system (CNS) compared to females. This reduces the child's ability to inhibit bladder emptying at night. Moreover, NE was found as prominent in larger families (Gür et al., 2004). In Malaysia however, the overall prevalence rate of NE was ever reported was eight percent of 200 children (Kanaheswari, 2003).

2.5 Risk factors of Nocturnal Enuresis

Generally, there were several risk factors that can contribute to the occurrence of NE reported elsewhere. These include multifactorial genetic factors, abnormal urodynamics, alterations in vasopressin secretion, sleep factors, psychologic factors, organic disease and maturational delay (Amen & Ferrer, 2004). While in Gur & Mah (2003), they indicated that delay in central nervous system maturation, undercapaciated bladder, malformations of the urinary tract, nocturnal insufficient antidiuretic hormone secretion and psychogenic factors were indicated as some of the etiologic factors that can contribute to NE. In addition to these, NE can also be provoked by consumptions of a lot of water before bed time and heavy snoring or sleep apnea due to adenotonsillar hypertrophy. Besides that, in a study by Wang et al., (2007), they found that the used of diapers in a longer period at preschool age was one of the contributing factors for persistent enuresis.

Gunes, Acik & Akilli (2009) argued that NE is a common, genetically complex and heterogeneous disorder among children. This is because male gender, younger age, family history and divorced parents are found as the common risk factors for NE in many studies (Table 2.1). According to Hjalmas et al., (2004), in an epidemiological study, the risk of NE was five to seven times higher if one parent had a history of enuresis. However, if both parents are affected, the risk ratio is 11.3 compared to only a parents affected or compared to unaffected parents. Kanehaswari (2003) supported this that 53 percent of children with NE in her study positive family history of NE.

Several other potential risk factors for NE are also indicated in Sureshkumar, Jones, Caldwell, & Craig (2009) as in Table 2.3. These include perinatal factors, developmental milestones, developmental concerns, encopresis, constipation, Attention Deficit Hyperactivity Disorder (ADHD), emotional stressors, kidney problems, urinary tract infections (UTI), and daytime urinary incontinence with a frequency of more than once in the past 6 months.

TABLE 2.3
Potential Risk Factors for Nocturnal Enuresis

Variable	Definition
Perinatal factors:	
<ul style="list-style-type: none"> • Premature birth • Newborn hospital admission • Medication during pregnancy 	Gestational age < 37 weeks Whether the child was in a special care nursery or intensive care after he/she was born Did the mother of the child receive any medication during the pregnancy
Developmental milestones:	
<ul style="list-style-type: none"> • Sitting • Walking 	Age at sitting without support Age at starting to walk at least 3 steps without help
Developmental concerns:	
<ul style="list-style-type: none"> • Fine motor skills • Speech • Learning at school • Social 	Parental concerns about the child's fine motor skills Parental concerns about the child's speech Parental concerns about the child's learning skills at school Parental concerns about the child's social behavior
Encopresis	Soiling of pants with more than a smear in a period of three months
Constipation	Present if the child had two or more of the following: straining more than 25% of the time in passing stool lumpy or hard stools more than 25% of the time in passing stool having fewer than three bowel movements per week
Attention deficit hyperactivity syndrome (ADHD)	Diagnosis with ADHD
Emotional stressors	Any frightening or emotionally stressful events that affected the child in the past six months
Kidney problems	Any anatomical abnormalities related to urinary system excluding urinary tract infection
Urinary tract infection (UTI):	
<ul style="list-style-type: none"> • Definite/probable • Possible • Negative 	Microbiologically confirmed definite or probable UTI with parental reporting of positive UTI Parental reporting of a positive UTI but unable to confirm with a microbiological result Microbiologically normal results
Daytime urinary incontinence	Daytime incontinence with a frequency of more than once in the past 6 months
Symptoms of bladder dysfunction:	

• Frequency	Micturating more than two times in a two hour period
• Urgency	Rushing to the toilet to urinate
• Holding postures	Adopting any characteristic postures to avoid incontinence
• Post-micturition incontinence	Having wet pants within half an hour of having passed urine

Adaptation from Sureshkumar et al., (2009)

2.6 Impact of Nocturnal Enuresis (NE) on Children and Family Daily Activities

Nocturnal Enuresis was a potentially stressful experience for both children and parents (Butler, Golding, & Heron, 2005). Children with NE was reported on facing parental disapproval, sibling teasing and lower self esteem, and increase risk of emotional, shame, embarrassment, guilt, helplessness, isolation and physical abuse (Glazener, Evans & Peto, 2008). Similar findings was also indicated in Gunes et al., (2009) and Wolfish & Pham (2009).

Butler, Golding, & Heron (2005) reported that from 8820 parents in Sudan, only a small number (48 percent, n= 3376) of parents became annoyed and intolerant especially for those who had older child with NE. On the other hand, one third of parents confessed they punished their child for NE. While in Naitoh, Kawauchi, Soh, Kamoi, & Miki (2012) reported that the parents felt burden for their additional time and effort to manage their child with NE. They also had had financial difficulties as they frequently had to wash bed linen, buy diapers, change bedclothes and replace mattresses. The other finding reported in the literature was family conflict (Tekgul et al., 2005).

2.7 Parents Strategies to Overcome their Child NE

Several strategies had been used by parents to live with a child who has NE as reported in the literature. Some of the common strategies taken by parents were restricting their child's fluid intake and waking up their child at night to help him/her void in the toilet instead. Table 2.4 outlines the diversity of strategies undertaken by parents to overcome their child's NE.

TABLE 2.4

The diversity and frequency of strategies undertaken by parents to overcome NE

Strategies used by parents to deal with their child's NE	
1.	Wake to void
2.	Lifting
3.	Fluid restriction
4.	Star charts
5.	Reward charts
6.	Wait for maturity
7.	Talk with child about the problem
8.	Having child change bed
9.	Alarm
10.	Medication
11.	Punishment

Adaptation from Butler et al., (2005)

2. 8 Parent's Treatment Seeking Behaviour for their Child's NE

In a Turkish study by Ozden et al., (2007), the authors reported that most of the children with enuresis was not treated whereby very few children (17.2 percents) of the children seen by physician. Most of the families preferred to seek traditional remedies rather than professional methods by physician in order to treat enuresis. So, the researcher decided to assess this issue through her study.

Thus, it can be assumed that most parents' had limited knowledge regarding NE. According to Schlomer, Rodriguez, Weiss, & Coop (2013), only 55 percent of parents sought medical care for their child and only 28 percent reported awareness of effective treatments in their study. Similar finding was also indicated in Kanaheswari (2003), when

she found that many Malaysian parents do not readily come forward to talk about their child's enuresis to their general practitioners. She concluded that this behavior may be due to the less accessibility of information on the availability of treatment and also the psychological impact of NE on their children. It may also be influenced by the cultural acceptance of bedwetting. The study was conducted in a primary school on school children aged between 7 to 12 years old in Kuala Lumpur. She found that only 3.64 percent of parents ever visited a physician and received professional help for NE problem. The study also reported that 45.67 percent families preferred to wait for some times because they believed NE is a benign self-limiting condition and that it will resolves on its own (Kanehaswari, 2013).

2.9 Treatment of NE

There were two common types of treatment available for NE, which were pharmacology and non pharmacology treatment. Some of the pharmacology treatment were Demopressin Acetate, tricyclic (antidepressants) and anticholinergics (Wolfish & Pham, 2009). While the non pharmacological treatment include motivational therapy, behavioural conditioning, bladder training exercise, psychotherapy, wet alarms and hypnosis (Heap, 2004). Wolfish & Pham (2009) further emphasized that the therapy for NE must involves several methods of treatment and should be goal-oriented with consistent follow-up.

The recommended treatment options as indicated in Neveus et al., (2010) and Ramakrishnan (2008) was shown in Table 2.5.

TABLE 2.5
Treatment Option for NE

No.	Treatment	Indication and Used	Effectiveness	Adverse effects
	NONPHARMACOLOGIC			
i.	Motivational therapy	-Younger children with primary nocturnal enuresis -Provides reassurance and emotional support, eliminates guilt, rewards continence (e.g., star or sticker charts)	Partial response in 75 percent of children; relapse in 5 percent of children	Frustration; reward system may worsen self-esteem if the child fails to have dry nights

2.	Bladder training	-Younger children with primary nocturnal enuresis -Postpones voiding for longer periods	Minimal improvement	None
3.	Dry-bed training	-Younger children with primary nocturnal enuresis -Includes waking children to void at specified intervals	Minimal improvement	Sleep deprivation
4.	Enuresis alarm	-Older, motivated children with primary nocturnal enuresis -Awakens child in response to an alarm triggered by wetness	Effective in two thirds of children; dryness persists in 50 percent of children who continue to use the alarm	Sleep deprivation
5.	Biofeedback	-Older, motivated children with primary nocturnal enuresis and dysfunctional voiding -Training for pelvic floor muscle relaxation	-Primary nocturnal enuresis: 81 percent effective -Lower urinary tract symptoms: 77 to 81 percent effective -Constipation: 73 percent effective -Daytime wetting: 58 percent effective	None
PHARMACOLOGIC				
1	Oral imipramine (Tofranil), 25 to 75 mg daily Oral desipramine (Norpramin), 1 to 3 mg per kg daily	Children with primary nocturnal enuresis	40 to 60 percent effective; response occurs within days; most patients relapse after discontinuing treatment	Drowsiness, gastrointestinal upset, seizures, arrhythmia, overdose, lethargy, agitation, depression, sleep disturbance
2	Oral oxybutynin (Ditropan), 2.5 to 5 mg three times daily	Children with urge incontinence or primary nocturnal enuresis and diurnal incontinence	47 to 71 percent effective; better response if combined with desmopressin (DDAVP)	Dry mouth, blurred vision, constipation, dizziness, tachycardia, headache, nausea, gastrointestinal upset
3	Oral desmopressin, 0.2 to 0.6 mg daily Intranasal desmopressin, 10 to 40 mcg daily	Children with primary nocturnal enuresis	60 to 70 percent effective; response occurs within days; 80 percent of	Headache, nasal congestion, epistaxis, sore throat, abdominal cramps, water intoxication,

patients relapse after discontinuing treatment	allergic reaction, hyponatremia, anorexia, nausea, visual disturbance, bad taste in the mouth
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Note: Children who do not respond to one or more measures may benefit from combined treatment strategies (e.g., combining nonpharmacologic and pharmacologic treatment or multiple pharmacologic therapies).

Adaptated from Ramakrishnan (2008) and Neveus et al., (2010)

2.10 Conceptual/Theoretical Framework

The Health Belief Model (HBM) was utilized as the framework of this study. The HBM was initially developed in 1950s by a social psychologist in US Public Health Services (Croyle, 2008).. This model was modified and improved further to effectively explain about people’s responses to symptoms, behavior in response toward illness and adherence to medical regimens (Champion & Skinner, 2008; Croyle, 2008). It is a very popular model that usually been applied in many nursing research especially in preventive measure for health care practices.

As in Figure 2.1, the model had four key components; 1) perceived susceptibility, 2) perceived severity, 3) perceived effectiveness, and 4) perceived cost. Perceived susceptibility means that one’s evaluation of the chances of getting a ill condition, perceived severity as one’s evaluation of seriousness of a condition, its treatment, and its consequences would be. Perceived effectiveness gave meaning of one’s evaluation of how well an advised action will reduce risk or lesser the impact of the condition. Lastly, perceived cost is about one’s evaluation of how difficult an advised action will be or how much it will cost, both psychologically and physically. The other component were cues to action that is about events or strategies that increase one’s motivation and also Self-efficacy: confidence in one’s ability to take action (Redding et al., 2000). In applying the HBM, mediating factors such as demographic, structural and social variables had also been explored.

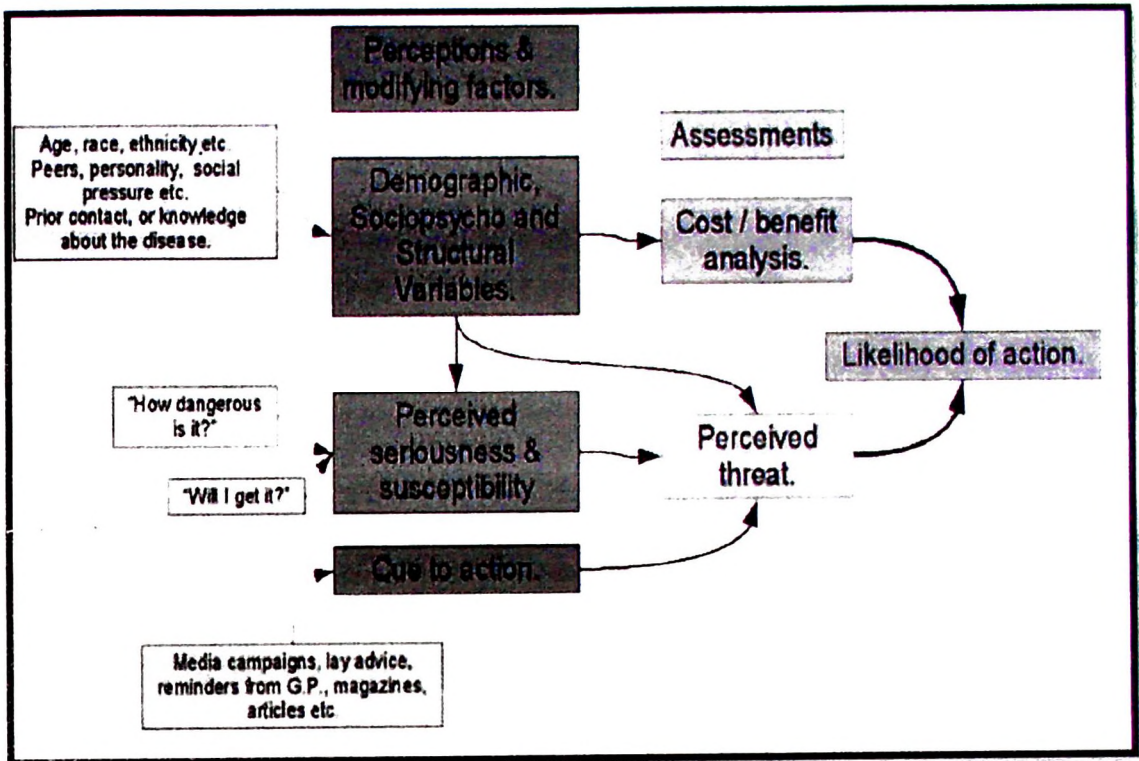


Figure 2.1 Health Belief Model adaptation from Champion & Skinner, 2008

CHAPTER 3:

METHODOLOGY

3.1 Introduction

The previous literature review has highlighted the common issues around Nocturnal Enuresis (NE) including the prevalence, risk factors and the impact of NE. Parents' strategy to cope with NE and their health seeking behavior for NE were also included. The review also indicated little research had been conducted on the phenomenon of NE in the Malaysian context. This chapter had been described about research design, population and setting of the study, sampling plan, variables, instrumentation, ethical consideration, data collection plan, flow chart of data collection and data analysis.

3.2 Research Design

The study was a cross-sectional survey with the aim to obtain required data regarding nocturnal enuresis (NE) by using self-administered questionnaire. This design will be employed because it helps to estimate the prevalence of the outcome of interest for a given population, commonly for the purposes of public health planning. It was also carried out over the short period of time, January to February 2014 (Levin 2006).

3.2 Population and Setting

The population of the study was among parents of kindergarten-aged children in Kubang Kerian, Kelantan. This study was conducted at four kindergartens in Kubang Kerian, Kelantan which were Tadika Elit Ria, Tadika Nur, Little Caliphs and Tadika Ilham Murni.

3.3 Sampling Plan

3.3.1 Inclusion and Exclusion Criteria

Inclusion Criteria

- Parents of children who attending four selected kindergarten of Kubang Kerian.
- Had children aged 5-6 years old who does not has congenital or required defects of the nervous system or urinary tract.
- Able to understand and read Bahasa Melayu.
- Agreed to participate in this study.

Exclusion Criteria

- Parents of children who attending kindergarten in other area.
- Had children aged below or above 5-6 years old
- Had children with congenital or required defects of the nervous system or urinary tract.
- Parents with adopted child

3.3.2 Sampling Method

Participant in this study was selected through simple random sampling method, either by using a random number generator. Through this sampling method, parent remaining in the sampling frame has the same probability of being selected for the study. The researcher selected the potential participant from the name list of kindergarten-aged children at each the kindergarten. Then, the parents were randomly chosen every two or four students name. Both parents (mother and father) of students were asked to participate this study.

3.3.3 Sampling Size

The overall population of children age 5-6 years old studying at kindergartens in Kubang Kerian, Kelantan is unknown. Therefore, in order to determine the required sample size for this study, the researcher had used statistic calculator from StatPat (2013). Sampling size in percentage is required to determine the sample size for research questions involving percents. The prevalence rate of NE previously reported in Malaysia was 8% (Kaneswari, 2008). Thus, the estimation rate of population is 8% (n=200). With a maximum acceptable difference of 5 % and confidence level of 95%, the required sample size for the current study is 113 participants. Considering 10% drop out of the participants from the calculated sample size, the estimated number of sample for this study is:

$$N=113 + 10\% \text{ drop out}$$

$$= 113 + 11$$

$$= 124 \text{ participants}$$

3.4 Variables

3.4.1 Variable measurement

These two types of variables in this study which are dependent and independent variables.

Dependent Variable:

- Nocturnal Enuresis (NE) among kindergarten- aged children

Independent variable

- Socio-demographic characteristics (age, gender, family income, family history of NE)
- School Performance (Social, Academic and Physical)
- Risk factors for NE
- Strategy used by parents to cope with nocturnal enuresis

- Treatment seeking behavior for NE

The school performance is open ended questionnaire that was categorized by social, academic and physical aspect. This section was filled by researcher only (Part B).

The prevalence of NE will be measured by dichotomous answer by Yes or No (Part C/Question 7).

The parents' strategies to cope with their child's NE (Part C/Question 19) and their treatment seeking behavior will be measured by the fill in the blanks (Part C/Question 15).

3.5 Instrumentation

3.5.1 Instrument

The instrument that used in this study was a combination of self-developed and modified questionnaires extracted from related articles on NE, (Gunes et al., (2009) and Semolic et al., 2009). The instrument was designed to answer the objectives of this study include determine if nocturnal enuresis was as prevalent as the literature states, to assess the association of child's school performance and NE, to determine how parents perceive enuresis in children five to six years of age, and to determine the parents' strategies to overcome their child's NE. The questionnaire was also to measure whether any treatments for enuresis were sought by the parents. All together, the questionnaires consists of three sections:

Part A: Socio-demographic data

This part consists of six questions to obtain socio-demographic data include child age, child sex, ethnic, number of siblings, family income, and parents' education level (Questions 1 to 6).

Part B: School Performance

The part consists of three category of school performance: social, academic and physical aspects of the children. Data for this part was obtained by the researcher herself by reviewing student's report book with the kindergarten's manager's permission. The question was the open ended questionnaire.

Part C: Nocturnal Enuresis

This part consists of 12 questions that was used to get information on:

1. Prevalence of NE ('Yes' or 'No') question no. 7
2. Risk factors of NE (dichotomous answer) – questions no. 8 to 14
3. Symptoms of enuresis (dichotomous answer) – question no. 18
4. Parents' treatment seeking behavior for their child's NE (open ended questionnaire) questions no. 15 to 17
5. Parents' strategy to cope with their child's NE (open ended questionnaire) question no. 19

3.5.2 Translation of Instrument

The instrument used in this study was initially written in English and then translated into Malay language by the researcher herself. Both versions were then checked by the supervisors and correction had been done following this.

3.5.3 Validity and Reliability

The validity and reliability of questionnaires were important in the data collection instrument in order to make sure the participants were treated ethically. The questionnaire was validated by three content experts which were among nursing lecturers of PPSK, USM. Following this, a pilot study on 12 participants had been conducted at Tadika Kemas Kampung Tunjong in January 2014 before the real study. Test-retest reliability had been used in this study. **Test-retest reliability** was a measure of reliability obtained by administering the same test twice over a period of time to a group of individuals. The

scores from Time one and Time two can then be correlated in order to evaluate the test for stability over time.

3.6 Ethical Considerations

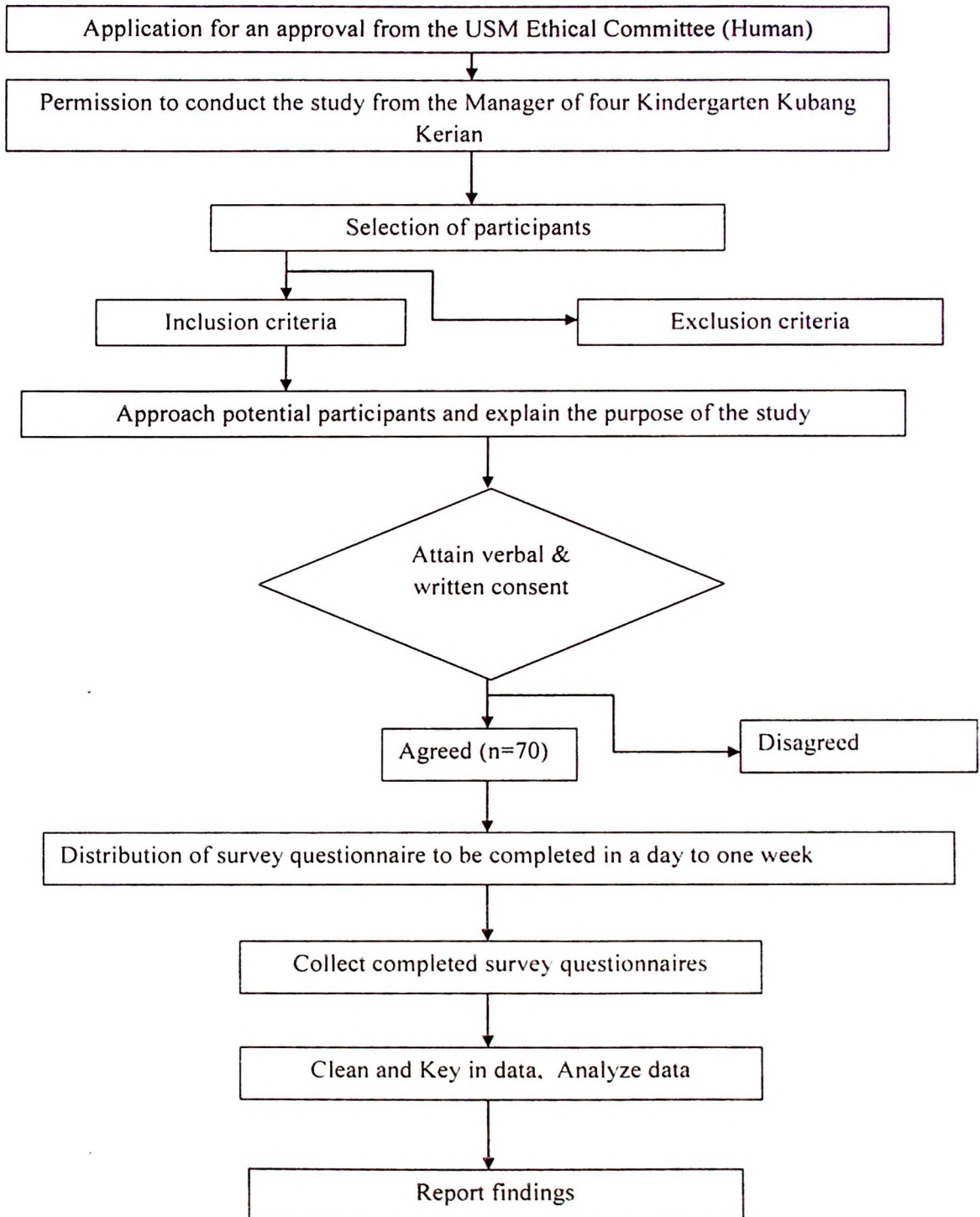
Ethical approval had been obtained from the Research Ethical Committee (Human), University Sains Malaysia before conducting the study. Permission also had been obtained from the Manager of selected Kindergartens in Kubang Kerian in which the study was conducted. Prior to distributing the questioning, the researcher had given adequate information to the participants about the aim and process of the study. Consent was also obtained from participants.

All participants had been informed that their participation was optional and they can withdraw from the study at any time. The anonymity of the participants had been protected. This was to ensure that the participants reported their experiences without being prejudiced (Ramli, 2007). They also made known that the entire information gathered throughout this study will be kept private and strictly confidential and used for academic and research purposes only.

3.7 Data Collection Plan

After receiving an approval to conduct the study from the Research Ethical Committee (Human) and the Head of Kindergartens in Kubang Kerian, parents was approached individually. After obtaining consents from the participants, the questionnaire was delivered to them. They had been asked to complete and return the questionnaire on the same day and also allowed to bring the form home if they need more time to completed the questionnaire. The researcher had collected it back in one week time.

3.7.1 Flow chart of Data Collection



3.8 Data Analysis

Data collected from the survey was analyzed using the Statistical Package for Social Science (SPSS Version 20.0). Socio-demographic data was analysed using descriptive statistics (frequencies and percentage). Inferential statistics included correlational procedures, non-parametric tests of significance, Pearson Chi-Square and STATA were used to analyze statistical relationships between socio-demographic characteristic and the NE and statistical relationship between school performance and the NE among kindergarten-aged children in Kubang Kerian, Kelantan. Confidence interval was set at 95% with a significant level at 5% and null hypothesis of $p < 0.05$ was rejected.