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## LITERATURE REVIEW

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# Nocturnal Enuresis

by

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### Abstract

*In Indonesia and in other parts of the world a child with nocturnal enuresis is not an uncommon disease. Studies on nocturnal enuresis is still restricted in Indonesia. It is highly recommended to understand the disease because wetting problems can continue to more serious psychic developmental problems in our young generation. This paper represents a review on some aspects of nocturnal enuresis.*

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### Introduction

Nocturnal enuresis is one of the most common perplexing problems in children; parents complaining of it in daily practice were ever heard though some of the parents are still ashamed to bring their child to the doctor (Budhiman, 1980; Ling, 1965).

It could be that the parents did not know that wetting problems may continue to more serious psychic developmental problems to the child.

Normal voiding is associated with a complex of physiological events involving the somatic and autonomic nervous system. Thus, detrusor contraction is accompanied by relaxation of the external urinary and rectal sphincters which ordinarily are in a state of tonic contractions, and also accompanied by a slight rise in blood pressure and pulse rate.

Neurogenic disorders, such as those produced by transverse myelopathy, result in changes in timing and intensity of these events (Abraham et al., 1966; Borzyskowski et al., 1978).

Enuresis is defined as involuntary discharge of urine, occurring after the age by which bladder control should usually have been established (Borzyskowski and Chantler, 1978; Formann et al, 1979; Kempe et al, 1976; Rubin and Baliah, 1975; Smith, 1978).

### Bladder control

Most children become dry at night between the age of 2 and 4 years. Dry-

ness is a natural development which emerges in the absence of any training. Adverse factors during this period may impair the acquisition and security of subsequent dryness (Ling, 1965).

There are still wide variations of the age of achievement of bladder mastery in children such as :

- Hensie (1960) found that an occasional wetting of the bed may be seen in 10 to 20% of children even as late as 9 to 10 years of age.
- Kanner (1960) said that some authors refer to the mode of micturition during the first two or three years of life as physiologic enuresis.
- Rubin and Baliah (1975) stressed that the bladder control at night is usually gained by 3 years of age, however, many children do not develop control until they are 5, 6 or 7 years of age.
- Borzyskowski and Chantler (1978) pointed out that most of the children are dry during the day by the age of 3, and dry at night by 4 but some 10% of 5 years olds wet the bed, as do 5% of 10 years olds.
- Drummond (1979) found that nocturnal enuresis is present about 10 to 15% of otherwise normal 5 years old children and in about 1% of normal children at 15 years.
- Due to the wide variation in the age of gaining bladder control in children, it is considered now that the children are not generally labeled "enuretic" unless the symptom per-

sists beyond the age of 5 years (Drummond, 1979; Hollerman, 1979).

### Sex incidence

Most authors suggest that enuresis occurs in both sexes with about the same frequency. Noyes and Kolb (1959) found that this condition occurs twice as frequently in boys as in girls. Kanner (1960) found that enuresis occurs 62% in boys and 38% in girls.

### Wetting incidence

Incidence of wetting in children as obtained by Kanner (1960) :

Daily	50%
Occasionally	11%
Frequently	7%
Almost daily	5%
Once a week	4%
Twice a week	4%
3 — 4 times a week	3%
Once a month	2%
Off and on	2%
In spells	2%
Infrequently	1%

Oei and Setyonegoro (1965) described that the type of chief complaint (which initiated the bringing of the child for psychiatric consultation by the parents) out of 556 patients they studied, was only in 11 (1,9%) enuresis.

Nocturnal enuresis commonly occurs only once during the night but in a small number of instances a child may wet as often as 3 or 4 times in one night. Diurnal enuresis alone is relatively rare.

Kanner's clinic figures are as follows :

Nocturnal only	63%
Nocturnal and diurnal	30%
Diurnal only	7%

### Types of enuresis

I. According to Noyes and Kolb (1959) and Drummond (1979), bedwetting may be divided into 2 types :

1. Persistent type, in which the child has never been dry at night.
2. Regressive type, in which a previously continent child begins to wet the bed after a stressful episode.

Persistent nocturnal enuresis is often the result of inadequate or inappropriate toilet training experiences. The regressive type of bedwetting is related to precipitating stressful environmental events, such as moving to a new home, marital conflict, birth of a sibling, death in the family, etc.

Bedwetting in these instances is often intermittent and transitory; prognosis is better and management less difficult than in those children who have never been continent.

In both types of bedwetting, organic pathology can be found in only a very small number of cases. Organic disorders that may cause nocturnal enuresis include nocturnal epilepsy.

Other organic conditions that may also lead to enuresis are o.a.: urinary tract infection, increased urinary volume in diabetes mellitus, diabetes insipidus, obstructive uropathy, chronic renal failu-

re and other conditions in which the ability to concentrate urine is impaired.

II. Borzyskowski and Chantler (1978) describe that enuresis could be as:

1. Primary enuresis, when the child has never been dry at night but is usually dry during the day.
2. Secondary enuresis, less common and occurs after a period of nocturnal continence.

#### Examination of a child with enuresis

The factors responsible for enuresis is not always clearly identifiable. The disability may be related to an anatomic problem, an organic etiology, a psychological problem, or idiopathic or essential (Hollerman, 1979).

Complete family history, physical examination, routine urinalysis, measurement of the urine specific gravity after an overnight fast is needed. If there is reason to suspect an underlying organic disorder, appropriate blood and urine studies should be carried out, including an intravenous urogram.

These studies are warranted only in a minority of patients with nocturnal enuresis (Drummond, 1979).

Kaada and Retveld (1981) investigated 420 enuretic children aged between 4 and 15 years and 100 controls; all were examined by EEG in order to determine their hyperventilation response, which is considered to be a non specific sign of brain dysfunction or of cortical instability as a result of delayed maturation.

It was found that an increased hyperventilation response occurred mainly among children with primary enuresis (bedwetters from birth).

This was true even if the children had an "uropathy". The results for those with secondary enuresis (later onset) were similar to the controls.

Their findings indicate that disturbed cerebral control of the bladder is an important factor in primary enuresis.

Psychological factors are thought to account for the occurrence of secondary enuresis (Kaada et al, 1981).

#### Etiology of enuresis

Etiologically there are several theories to explain enuresis (Hollerman, 1979):

##### 1. Small bladder.

At age 2-4 years the bladder capacity is 200-340 ml of urine. It is believed by some that nocturnal enuresis is the result of a decreased bladder capacity; however, not all children with small bladder are enuretic.

##### 2. Allergy.

The bladder wall is believed to be the target organ with resultant edema and subsequent decreased functional capacity. No positive relationships has been identified.

##### 3. Deep sleep.

No difference in depth of sleep between enuretic and non enuretic children has been documented.

##### 4. Behaviour problems.

There appears to be a relationship between behavioral problems and diurnal enuresis and/or encopresis but not for children with nocturnal enuresis. There is one exception to the latter statement; nocturnal enuresis in teenage delinquent boys appears to be related to earlier maternal separation or deprivation (Couchells et al, 1981).

##### 5. Intelligence and/or Electroencephalographic patterns.

No correlation has been found so far, though Kaada and Retveld (1981), found an increased hyperventilation response in EEG occurring mainly among children with primary enuresis.

##### 6. Spina bifida occulta.

It is commonly diagnosed in enuretic children though no positive correlation exists.

##### 7. Bacteriuria.

A positive correlation is found in girls between bacteriuria and enuresis, but at the maximum only 10% of enuretic girls will have bacteriuria (Heale, 1981).

##### 8. Familial pattern.

If one parent is enuretic 25% of the children will be enuretic; if both parents are enuretic, 50% of the children may become enuretic (Burke and Stickler, 1980).

##### 9. Developmental delay.

This may be associated in familial enuresis or may be the etiological factor

in the majority of children with enuresis. By age 10-12 years virtually all children have achieved full bladder control; however, enuresis may persist into adolescence (Hollerman, 1979).

#### Differential diagnosis

Enuresis should be differentiated with urinary incontinence. Enuresis is voiding of urine inappropriately in the absence of neurological or urinary tract disease, at an age when most children have bladder control.

Incontinence is the voiding of urine inappropriately as a result of neurological or urinary tract disease (Borzyskowski, 1978; Ling, 1965).

Thomas et al. (1980) found that about 90% of the incontinent boys aged 5-14 years had nocturnal enuresis; of the incontinent girls in this age range only 60% were bedwetters, the remainder complaining mainly of urge incontinence.

The main causes of incontinence in childhood are anatomical abnormality, mental subnormality and neuropathic bladders (Borzyskowski and Chantler, 1978; Chusid and Mc. Donald, 1960).

#### Treatment of enuresis

In enuresis due to organic causes, such as urinary tract infection and diabetes mellitus, treatment is directed at the disease process.

For the psychologically handicapped child professional psychological/psychi-

atric therapy is indicated (Stewart, 1975; James, 1976; Borzyskowski and Chantler, 1978; Hollerman, 1979).

For the child with essential enuresis, 5 categories of therapy have been suggested:

- a. Supportive,
- b. Retraining schedules,
- c. Drug therapy,
- d. Waking agent,
- e. Dietotherapy.

1. In supportive therapy the child is encouraged to set his own behaviour modification therapy. With no medication, he is responsible for obtaining it from his parents. The parents praise success and ignore failures.

2. Retraining for children with nocturnal enuresis is primarily based on the small bladder capacity therapy and aims at increasing bladder capacity by first forcibly delaying micturition, then increasing fluid intake after prolonged dry periods have been obtained.

3. Imipramide is the drug of choice in the patient with nocturnal enuresis. With the initial dose of 10 mg orally following the evening meal with gradual increase in 1 to 2 weeks to the maximum dose:

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| 5 — 6 years :   | 40 mg |
| 7 — 8 years :   | 50 mg |
| 9 — 10 years :  | 60 mg |
| 11 — 12 years : | 70 mg |
| 13 — 14 years : | 75 mg |

If improvement occurs the therapy is continued for two to three months, then gradually tapered off over 3 to 4 months. Imipramide changes the sleep pattern and decrease the bladder tones.

Imipramide is rapidly absorbed and in toxic levels can affect the central nervous system (depressed respiration) and has cardiovascular effects (arrhythmias, hypertension). (Hollerman, 1979; Rutter and Herlov, 1976).

There is no specific antidote for this drug, and dialysis is not effective to remove the drug.

4. The buzzer (waking agent) is apparently the most efficient waking device. If used appropriately 80% of children with nocturnal enuresis will be cured in the period of 1 week to 6 months.

5. Dietotherapy (elimination of dairy products) has been presumed useful in patients diagnosed as having enuresis secondary to food allergy.

The management of the child with enuresis will continue to be a time-consuming venture on the part of any clinician.

Except in those patients who have an underlying organic disease, enuresis is not associated with a profound morbidity or mortality.

The inclination is either to reassure the parents that the condition will be "outgrown" or to use drugs for control. These children are deserving a careful, complete history and physical examination and a program of therapy based on delineation of the underlying etiology.

### Prognosis

Regressive type of enuresis is often intermittent and transitory, prognosis is

better and management less difficult than in those children who have never been continent (Drummond, 1979).

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