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2.1. INTRODUCTION

All children in the surge of growing up encounter minor stresses. This occurs when there is a change of house or school, birth of a new baby at home etc. Such stresses demands immense maturity and self control on the part of the child. Most children, at some time or the other, react to these stresses with temporary behaviour disorders such as temper tantrums, nightmares, bed-wetting etc. Till the age of 5, bed-wetting is considered as a normal developmental process in a child. While some children cross this developmental milestone quite early, others cannot achieve bladder control even after 5 chronological years. (The chronological age of the child must be at least 5 years to achieve continence. DSM III-R)

Primary Enuresis means that the child is continuing his habit of bed wetting from his birth. But if a child grows out of his habit of bed wetting for a time period, but again resumes wetting the bed it is termed as Secondary Enuresis. Both these types of enuresis, namely, Primary and Secondary could be precipitated by either biological (Organic) or psychological underlying causes.
In this Chapter, the researcher reviews the past literature on both these viewpoints, namely, Biological and Psychological causes, and also discusses the different treatment modalities utilized in various studies. Indian studies related to this area are very few, comparatively.

2.2. PRESENT STUDY:
Down the centuries around the world, in both primitive and civilized societies, enuresis has been a cradle of unhappiness and embarrassment for many people. Often an enuretic child was belittled. Along with ridicule, the enuretic child was frequently subjected to harsh and ruthless punitive treatments.

Ebers Papyrus documents that bed wetting was well known in 155 B.C. By the time the Greco - Roman thought was approaching its maturity, the encyclopedist Pliny could codify a variety of prescriptions for bed wetting, including consumption of wood lice and swine's urine. Although the first paediatric textbook that appeared during the Renaissance discussed bed wetting, the therapies used in Britain as late as the 19th century were similar to Pliny's approach and rationale. Children were offered mice pie as a curative for wetting the
bed. These children probably endured this therapy better than their peers who were treated by Corporal punishment. By 1900's doctors realized that no matter what sort of treatment was suggested, if done with authority, zeal and kindness, many cases of enuresis could be resolved. This confirmed what the history had always indicated - namely, that no one knew what caused enuresis or how to manage it to achieve consistent success.

Today, additional data is obtainable for its causes and treatment possibilities. However, enuresis still baffles medical expertise.

Professional attitudes towards enuresis have often reflected the specific medical specialty of the researcher. Thus, psychologists have attributed enuresis to psychological conflicts such as castration anxiety. Urologists have tended to focus on urological abnormalities. Sleep specialists have described it as a disorder of arousal. Finally, neurologists have suggested a relationship between enuresis and epilepsy.
2.3. STUDIES ON BIOLOGICAL / ORGANIC CAUSATIVE FACTORS

a. Family / Genetic Influences

It is an authenticated certainty that enuresis runs in families. Approximately 70% of clinically referred enuretics have a first degree relative who was enuretic as a child (Bakwin, 1961). Familiality is not an artefact of clinical referral because it is also found in non-referred samples. In their study of a New Zealand birth cohort (n = 1265), Fergusson et al (1986) found that a family history of enuresis was the most important predictor of delayed bladder control, and in a Finnish community study Jarvelin et al (1988) calculated a relative risk for enuresis of 7.1% among offsprings of male and 5.2% among offsprings of female enuretics. In a twin study of unreferred subjects that verified zygosity by blood studies, Bakwin (1973) showed that concordance for enuresis was significantly higher in monovular than in binovular twins (68 versus 36%). Although there have been no studies done on twins who are reared apart, Kaffman (1962) found an excess of enuretics among the relatives of early-wetting children living in a kibbutz (reared in part by adults...
other than their parents). The relationship between a positive family history and some of the associated features of enuresis has not been studied in unselected samples. In two small clinical studies we observe that (a) familiality was as common in primary as in secondary enuretics, (b) a relationship was found between a positive family history and a higher rate of parental discord and (c) if the mother had been an enuretic, a higher rate of psychiatric symptomatology in the child could be found. (Mikkelesen et al, 1984)

b. Circadian Rhythms

Lewis et al (1970) published two detailed case reports of enuretic children with immature circadian rhythms, and hypothesized that nocturnal polyuria might have contributed to their condition. Urine output is normally reduced at night to approximately one third of the daytime rate. During the first year of life, this rhythm is absent and infants excrete urine at a constant rate (Hellbrugge, 1960). More recently, Norgaard et al (1985) and Rittig et al (1989) have studied diurnal variation of circulating vasopressin, urinary excretion rate and urinary osmolality in 15 enuretics aged between 11 and 17 years, and 11
age - weight - and sex matched non-enuretic controls. The
enuretics had a significantly less marked change in diurnal
rhythm with higher nocturnal urinary excretion rate and lower
urine osmolality. Repeated studies are required to determine
whether this is a robust finding, and if it can be reversed with
behavioural treatment when spontaneous remission occurs.

c. Bladder Size & Function

A number of studies (Starfield, 1967; Esperanca & Gerrard,
1969; Jarvelin et al, 1990, 1991) have found lower urinary
voided volumes in enuretics than controls, although with sizable
overlap between both groups. Using age and weight
standardized norms, Gardner & Schaffer (1984) and Schaffer
et al (1984) found that 55% of a population of self referred
enuretics in a school clinic had a functional bladder volume
greater than that of a normal child. Low functional volume was
considerably related to behavioural disturbance, and was more
common in children with current language or speech
difficulties. It was unrelated to primary or secondary status,
positive family history or social disadvantage. Again, the nature
of the differences is not clear. Cystometric studies (Troup &
Hodoson, 1971; Norgaard et al, 1989; Norgaard, 1991) indicate that the anatomical bladder capacities of enuretics during anaesthesia or sleep do not differ from controls. Norgaard (1991) measured spontaneous bladder activity of enuretics during sleep and concluded that bladder function is essentially normal, but the urine production was abnormally large. It is not clear whether functional bladder volume is causally related to enuresis. Successful treatment with behaviour therapy occurs without an increase in functional bladder volume. There are still other studies (FBV; Fielding, 1980; Schaffer et al., 1984; Geffken et al., 1986) which point out that bladder capacity overlaps between enuretics and non-enuretics of the same age, and some enuretics with small bladder capacities have dry as well as wet nights. However, Functional Bladder Volume (FBV) could play a role in initiating the condition coupled with other developmental delays. In reality, it makes it difficult for a toddler to learn bladder control.
d. Developmental Changes in the Bladder Neck

Hutch (1972) described an array of anatomical changes that take place at the base of the bladder during the first 6 years of life which appear to increase the effectiveness of the internal sphincter. These developments were significantly delayed in enuretics. These findings have not been replicated and are of uncertain significance, given that nocturnal continence is acquired in many children even before the anatomical changes are complete.

e. Other Developmental Delays

Two large prospective birth cohort studies (Essen & Peckham, 1976; Fergusson et al, 1986) and a large retrospective clinical study (Steinhausen & Gobel,1989) have noted a relationship between enuresis and early delay in motor, language and social milestones. These were not confirmed in a third prospective cohort study that used somewhat more limited measures (McGee et al, 1984). Clinical studies suggest that psychiatric symptoms are more common in enuretics with a history of motor and speech delay (Hallgren, 1957; Mikkelsen et al, 1980;
Schaffer et al, 1984). Community studies by Miller (1973) and, Essen and Peckham (1976) found that enuretics were shorter than non-enuretics, and Douglas (1973) reported an association between bed-wetting in the mid-teens and delayed puberty.

**f. Minor Neurological Abnormalities**

Among referred clinical enuretics, psychiatric disturbance is more prevalent in those with minor neurological signs (Mikkelsen et al, 1980; Schaffer et al, 1984). In a longitudinal study of an unselected birth cohort, enuresis was significantly more common in females in whom abnormal motor signs (poor coordination etc.) had persisted through middle childhood (Lunsing et al., 1991).

**g. Intelligence**

Many studies have investigated the cognitive function of enuretic population by standard IQ testing. Barbour et al, 1965 reports a tendency for adolescents with persistent enuresis to have lower IQ score. IQ differences in Oppel's Series was found only for low birth-weight groups. In an unselected population,
entireties did not differ from non-enuretics with respect to IQ (McGee et al, 1984). However in a study that was over-sampled for handicapped and retarded children, it was found that enuresis was several times more prevalent in such groups than in the general population (Jarvelin et al., 1988).

h. Sleep Abnormalities

In a prospective longitudinal study, Fergusson et al (1986) noted that toddlers aged between 1 and 2, who slept more than 15 hours a day were likely to develop bladder control at a latter age than those who slept for shorter periods. It is not known whether the pattern of excess sleep quantity continues as the child gets older. Mikkelsen and Rapoport (1980) studied enuresis and sleep architecture and noted that enuretics wet at all stages on a seemingly random basis, the frequency of events within one sleep stage being proportional to the amount of time spent by the individual in that sleep stage. In un-replicated research, Norgaard et al (1989) found that increase in urinary flow does not influence sleep stage, and changes in sleep stage do not affect intravesical pressure. However, in a larger study using different recording techniques, Watanabe and Azuma
(1989) found that while normal subjects showed a sleep stage change from 1 to 4 when bladder volume approached capacity, leading to awakening and then conscious voiding, most enuretics showed the sleep stage change, but failed to wake further.

**EEG & Sleep Abnormalities**

EEG abnormalities were reported in enuretics by Takayasu (1963). He suggested that enuresis may represent an "Epileptic Equivalent". Paussant (1967) compared 138 enuretics and found EEG abnormalities in 10% which is the same as the general population. Oloffson et al (1971) while making a comparative study of enuretic versus normal population found EEG abnormalities in enuretic group.

Subjective reports that enuretics are more difficult to arouse from sleep are well known. Sleep EEG recordings have been obtained in a number of studies. Mikkelsen et al (1980) could not find any specific abnormalities in a group of enuretic children using various sleep EEG parameters. However, Pooughton (1982) proposed that enuretic episodes space delta sleep, and are preceded by arousal signals and increased reactivity of the bladder.
"Soft" neurological signs have been described as occurring more frequently in groups of children with behaviour and learning problems than in "normal" children. Schaffer (1984) has defined a neurological soft sign as "non-normative performance on a motor or sensory test identical or akin to a test item of the traditional neurological examination but a performance that is elicited from an individual who shows none of the features of a fixed or transient localisable neurological disorder".

They include phenomena as *dysdiadochokinesia* mirror (contralateral associated) movements, *dysgraphesthesia*, *astereognosis* and the "chorieform twitch". These can be reliably elicited between raters and within the same subject over time, and it has been reviewed and established (Schaffer, Rutter M. et al 1970). M. Rutter divided the "Soft" signs into three categories. The first group consists of signs of developmental delay which includes speech, language, motor co-ordination, perception, R-L differentiation, adventitious motor overflow, or extinction to double simultaneous tactile stimulation. These can be reliably assessed. The second group
consists of signs which can be due to neurological and space causes such as *strabismus* and *nystagmus*. The third group consists of slight abnormalities which are difficult to detect such as mild asymmetries of tone, reflexes or of size of limbs.

"Soft" signs may have four possible etiologies:

1. They may result from some early acquired brain damage.

2. They may be developmental phenomena i.e. they are transient phenomena that pass with neurological maturation.

3. They may represent heritable differences i.e. there may be a genetic basis for these signs.

4. They may be epiphenomena which can be influenced by learning, motivation, attention and stress.

Various methods have been used to record and assess soft signs. The routine neurological examination may be used. However, more reliable and valid are the test of motor development. The
Oseretsky test of motor proficiency is one such test. It consists of 85 items. It measures a child's motor development. It involves the use of too much equipment and no true normative data are available.

The Neurological Department of McGill University in Montreal, Canada conducted a 3½ year study of sleep. In this study, they used electrical sensing devices on sleeping individuals, including some inserted into the bladder to measure pressure. In this way they were able to measure accurately what takes place during sleep.

Line A on the diagram on the following page shows the level of consciousness when a person is awake. Gradually, as the person falls into sleep, he or she starts to drift down through stages 1, 2, 3 and 4 (Line B), stage 4 being the lowest level of sleep (Line C). The average person stays in stage 4 sleep for approximately twenty minutes and then gradually comes up through stages 3 and 2 into what is called R.E.M. sleep (Line D). R.E.M. is the abbreviation for "rapid eye movement", which is the rapid
movement made by the eyes under the closed eyelids while the person is dreaming. R.E.M. occurs only between stages 1 and 2. This cycle of moving to stage 4 and up into R.E.M. sleep takes about 90 minutes and occurs about five times each night for most people.

The bed wetter, on the other hand, drops swiftly on to lowest level of sleep along Line E to stage 4. Instead of staying there for only 20 minutes or so, he or she remains at this level for long period of time. If sufficient bladder pressure develops, a normal sleeper is able to awaken, but the bed wetting individual cannot do this. In the bed wetter, sufficient bladder pressure will notify the brain and the sharply inclined line (Line F) indicates that the bed wetter is trying to awaken, but cannot penetrate through R.E.M. to wakefulness.
The McGill scientists found that at the instant wetting started, bed wetters went right back to stage 4. The duration of the steeply inclined line (Line F) varied from 20 to 90 seconds. The scientists also found that bed wetters could be taken out of bed, made to walk, talk, and go to the bathroom, all while still in stage 4 sleep; They failed to remember the incident at the next morning. In some individuals, bed wetting occurred three or four times a night. From this pattern of sleep as opposed to the ordinary pattern of sleep, one can now understand why the bed wetter has no control while asleep.

**i. Neuro-Pharmacology: Neuroleptic - Induced Enuresis**

The powerful anti-enuretic activity of the tricyclic antidepressants (TCAs) has led to speculation about the neuropharmacological basis of enuresis. The rapidity of action and the fact that they work on children with and without associated psychiatric problems make it improbable that it is a function of their antidepressant effect. Although TCAs reduce the amount of rapid eye movement (REM) sleep, enuretics do not have abnormalities of sleep architecture (Mikkelsen et al., 1980) and other drugs such as the amphetamines do the same.
and yet have no anti-enuretic effect. Imipramine increases functional bladder volumes both while awake as well as in sleep (Schaffer et al, 1979). A degree of bladder relaxation may be brought about by the drug's anticholinergic activity, but more potent anticholinergics such as propantheline and methscopalamine are ineffective in enuresis (Wallace & Forsythe, 1969; Rapoport et al., 1980)

**j. Urinary Tract Infection**

Five percent of clinically referred enuretics have evidence of a Urinary Tract Infection (UTI, Kunin et al, 1962; Schaffer et al, 1968) five times the rate found in general population (Savage et al, 1969). Conversely, the prevalence of enuresis in infected girls is five times greater than that of the general population. (Dodge et al, 1970) Infection is most common in female enuretics, in those who wet frequently and in day-wetters (Kunin et al, 1962; Schaffer et al, 1968; Dodge et al, 1970; Halliday et al, 1987; Jarvelin et al, 1990). There is some evidence that enuresis may facilitate ascending infection. Infected enuretic girls who continue to wet are more likely to
become re-infected than enuretic girls who become dry (Dodge et al, 1970). Effective anti-biotic treatment in infected enuretics cannot be relied upon to cure the enuresis (Jones et al, 1972).

2.4. STUDIES ON PSYCHOLOGICAL CAUSATIVE FACTORS

a. Toilet Training

Prospective studies in New Zealand (Fergusson et al., 1986) and Israel (kaifmann & Elizur, 1977) suggest that enuresis is more likely among children who start toilet training after the age of 18 months. The rate of enuresis of 6 - 8 years old among children reared in a Kibbutz where training was started before 20 months was 5% compared with nearly 20% among those who started training later. This is likely to be so since parents who experience difficulty training their infants defer the process, whereas in the Israeli study the onset of training varied as a function of kibbutz rule rather than the individual characteristics of the child.
**b. Stress Experiences**

There is conflicting evidence on the relationship between early stress events and later enuresis. In an early longitudinal study, Douglas (1973) found that children who had more stressful life events at 3-4 years of age had a twofold increase in the risk of enuresis. There seems to be a clearer relationship between stressful events and the onset of enuresis which include birth of a younger sibling (Werry & Fergusson, 1965), severe head injury (Chadwick, 1985) and natural disaster (Durkin et al, 1987).

c. **Gender**

For several decades it has been reported in nearly all studies that boys are more likely than girls to suffer enuresis. An often cited statistic is that boys are twice as likely to be enuretics. Reasons for this difference have been ascribed to social attitudes in child rearing, whereby girls are not permitted to be untidy and hence they are trained to greater fastidiousness. Other reasons ascribe the known decreased incidence in girls to easier submission to training and the fact that female enuretics
have relatively fewer problems in other areas of their lives, so that they are not brought to medical attention. Some argue that the incidence ratio reflects genetic considerations. On those occasions when male and females enuretics have been followed, it seems that boys cease their wetting latter than females. Further, at all ages boys are more wet than girls. This raises the issue of differential maturation between boys and girls (Fergusson et al, 1986).

d. Resistance to Change

Dimson and Umphress et al, (1982) found a correlation between amount of resistance to change manifested by the child and bed wetting. Strict methods of toilet training tended to provoke more resistance, but enuretic tended to be more resistant even if lenient methods were used. The mothers of enuretics did report slightly more anxiety and negative feelings towards training than control mothers.

There are many psychodynamic speculations deemed to be causative factors for enuresis. Enuresis is viewed as a desire for regression, a bid for attention, an active plea for help, a
stated resentment to parents, a masturbatory equivalent, a clinging to infancy and the expression of anger and resentment. Still other theories suggest that the enuretic is upset over sibling rivalry or feelings that he is an unwanted child. Thus enuresis is thought to be a demonstration for an unwillingness to grow up.

**e. Family Social Background**

Socioeconomic factors may influence the development and persistence of bed wetting behaviour. This disorder is more prevalent among children of manual labourers and it occurs the least frequently among children of prosperous professionals. This discrepancy is attributed in part to the fact that toilet training begins later in poorer and less educated groups than in the rich and the professionals. (Blomfield JM, Douglas, Essen J Peckham). Other workers have stressed the importance of "Toilet Training" and Gill (1940), who estimated that 4% to 5% of all children evacuated to Brighton were enuretic, considered their low standard of living as the causative factor.
Psychiatric disturbance is present in only a minority of enuretics but it is two to six times more common than in nonenuretics. The association has been found in community studies and so is not a referral artefact, nor can it be explained by differences in social background. The association is the strongest in girls, in children who also wet during the day and in secondary enuretics (Hallgren, 1956; Rutter et al., 1973; Essen & Peckham, 1976; McGee et al., 1984).

Symptoms that have been thought to be specifically related to enuresis have included tics, temper tantrums, nail-biting, fire-setting and cruelty to animals (Felthous & Bernard, 1978; Jacobson, 1985). However, systematic studies have failed to show a consistent or specific pattern for associated psychiatric symptoms (Lickorish, 1964; Rutter et al., 1973; Mikkelsen et al., 1980) or a specific association with deviant personality profiles, including passive-aggression, emotional immaturity or passivity (Achenbach & Lewis, 1971).
There is evidence of a dynamic link between psychiatric disorder and enuresis. Essen & Peckham (1976) found that 7 year old children who would become dry by age 11 years had an intermediate level of problems compared to children who had never been wet and those who would remain wet. In the Isle of Wight longitudinal study (Rutter et al., 1973) we find that children who were both wet and disturbed at the age of 10 years were more likely to have stopped wetting their bed by the age of 14 years if they were no longer psychologically disturbed. Such findings would be compatible with enuresis being either a cause or a consequence of psychiatric disorder.

### g. Enuresis as a Symptom of Underlying Disturbance

Many enuretics who wet frequently at home are dry when they sleep with relatives or on a holiday (Molling et al., 1962; Stein et al., 1965). Relatives point to these phenomena as an example of bed wetting being a purposeful and hostile act. However such children often admit to anxiety about wetting when in an unusual setting, and their dryness may be bought at the expense of fitful sleep. Treatment studies offer little support for this model. If wetting was a direct manifestation of psychiatric
disorder, one might expect that purely symptomatic therapies such as the night alarm would be less effective in disturbed than in non-disturbed enuretics, but this is not the case (Behrle et al., 1956; Young & Morgan, 1973).

Bed wetting is a distressing and, in some cases, stigmatizing condition. A number of studies have shown that enuretics who have been successfully treated with the night alarm become more assertive, independent and happy and that they gain in self-confidence (Behrle et al., 1956; Lovibond, 1964; Baker, 1969; Moffatt et al., 1987). These changes do not seem to be due to a nonspecific effect of treatment intervention as they were less marked when treatment was unsuccessful. However, two studies (Schaffer et al., 1984; Moffatt et al., 1987) found no change in psychiatric symptoms among children treated successfully with the night alarm. This confirms a general clinical impression that curing a disturbed child's enuresis may make the child happier and relieve one source of stress, but it rarely cures the underlying disturbance.
2.5. STUDIES ON TREATMENT MODALITIES

a Enuretic Alarm / Bell & Pad

The enuretic alarm or bell and pad method of treating enuresis utilizes a urine-sensitive pad placed in the child’s bed, which is connected to a bell / buzzer or light. The electrolytic effect of urine completes a circuit, activating an alarm that continues to sound until manually turned off. Newer models of the alarm involve smaller, credit-card size pads attached directly to the child’s underwear.

The urine alarm procedure teaches the child to awaken when it is necessary to urinate and go to the bathroom to void. Many children treated with this method also learn to retain urine and sleep through the night in order to avoid the aversive alarm. Positive attention from the parents and the therapist also plays an important role. Outcome studies on the effectiveness of urine alarm have demonstrated that this method eliminates wetting in 70% to 90% cases.
In the literature from 1960 to 1975, Doleys found that across all studies using the urine alarm, 75% of 628 patients were successfully treated in 5 to 12 weeks. However, Forty one percent of them relapsed within 6 months of treatment. Despite the relatively high relapse rate, empirical studies confirm the urine alarm as one of the most effective methods available for treating enuresis. When compared with other forms of treatment, it has been found more efficacious than a placebo, the presence of an inoperative alarm, verbal psychotherapy, retention control training or Imipramine (Doleys, 1979). Relapse after treatment may be decreased by using over learning procedures and intermittent reinforcement schedules.

b. Dry Bed Training

Axrin et al, (1982) developed a multidimensional approach to enuresis known as "Dry Bed Training". This approach uses operant conditioning principles to teach the child the responses necessary for remaining dry at night. Positive reinforcement for inhibiting urination, retention control training, positive practice, nighttime awakening, mild punishment, and an alarm were all incorporated in this procedure while dry bed training was initially described.
Several modifications were subsequently made, including possible omission of the urine and use of increased office based training for the parents and the child in place of the technician. In the initial evaluation of dry bed training 100% of the 24 children achieved the 14 nights dryness criterion (set by the authors), and none were reported to have relapsed at the 6 month follow-up. Subsequent replications have yielded encouraging but less remarkable result. Further research with dry bed training has attempted to examine which components of the program contributed to its success. Although the alarm represents the core of dry bed training, the addition of other components significantly increases the effectiveness of the procedure as a treatment for enuresis.

c. Method to Increase Bladder Capacity

For a long time it has been known that Enuretics have small functional bladder capacity. This fact led urologists to promote the treatment of enuresis by bladder training. In this therapy, the patient is asked to quantify his ability to drink measured volume of fluid and to withhold increasingly larger in accommodating greater quantities of urine. At night the patients heightened threshold for retention eliminates the problem of bed-wetting.
The cures attributed to this method, as in other cures, may result from the attitudinal changes by the family and the patient. Further, in many cases, adjunctive treatment is used such as having the child use star charts as he qualifies his performance and reduces his symptoms. The child also learns to restrict the intake of fluids after the evening meal. In addition, he may become aware of the diuretic effect of certain fluids such as colas, cocoa, coffee and tea. At the present time, bladder training methods, with or without the miscellany of adjunctive treatments, can be useful in treating Enuretics. Such methods can be used in combination with other treatment. In such cases the patient is involved in contributing to his cure. This is a powerful inducement to the elimination of the habit (Moffat MEK, 1987).

d. **Bladder Stretching Exercise**

Bladder stretching by voluntarily prolonging the intervals between voiding is based on assumption that improvement in bladder capacity will improve or eliminate enuresis. This approach is useful in children over the age of 6 years with small
bladder capacities and persistent detrus or has instability of the
infantile type. The normal bladder capacity can be estimated
from the following formula.

\[
\text{Bladder capacity (in ounces)} = \text{age (in years)} + 2
\]

OR

\[
\text{Bladder capacity} = 10 \text{ ml/kg}
\]

Gerard M. W. (1955) suggests that during the daytime the child
can be encouraged to hold his urine as long as possible. If he
feels the urge to urinate, he can be asked to do something to
distract himself for 10 seconds or so. In the process, the urge
may not occur again for 20 or 30 minutes. Help the child
postpone responding as many times as possible. Give a lot of
fluids to the child until 4 pm during the day. Have him urinate
in to a measuring cup and mark it. When he breaks an old
record give him a special reward.

*e Psychotherapy Or Counselling*

Varying success has been reported with psychotherapy.
However, it probably does not play a major role in the patients
who do not have underlying psychopathology. It may be
undertaken as an isolated mode of management or as an adjunct
to other specific regimens. The goals of counselling encompasses the following:

1. Parental understanding of the multifactorial nature of enuresis.

2. Parental acceptance of the child and his symptoms to provide maximum emotional support through positive interaction.

3. Instilling in the child and his family the same optimism projected by the clinician.

4. Development of an appreciation on the part of the child that he and not his parents, is responsible for and can have control over enuresis.

5. Enhancement of the social maturity of the children who demonstrate immaturity in social interactions.

The needs of most families are best met by provision of such counselling by the paediatrician, a skilled nurse or a mental health professional. In depth psychotherapy may be indicated when there is a strong suspicion of significant psychopathology.
f. Motivational Counselling

Few children with nocturnal enuresis or their parents require psychotherapy to address the associated issues; however, almost all benefit from motivational counselling. The format and approach of counselling are dependant on the experience and comfort level of the health-care professional conducting the counselling sessions, as well as on the nature of the child and the family dynamics.

The child is the key component in the motivational counselling. By educating the child, the health care professional can remove the child's guilt about bed-wetting, explain that many other children also wet their bed, and point out that in many children enuresis resolves spontaneously. Parents should be advised that enuresis does not reflect negatively on them, and that they must serve as support for the child. As such, parents need to be able to recognize inappropriate responses, especially punishment to their child's enuretic symptoms.
Through motivational counselling, the child learns to assume responsibility and become an active participant in the management program. He or she should be informed about the therapeutic options, and agree to and understand each step in the treatment plan. Verbal praise from parents is appropriate for all children.

The success of motivational counselling remains controversial. Result from one study indicate that 70% of children experience "marked improvement" in achieving dryness with this method; another study documented a 25% success rate. Combined with other modalities, motivational counselling may provide a format for educating the child and the parent, as well as contribute to nighttime continence.

g. Drugs

The use of Imipramine, a tricyclic antidepressant, has become increasingly popular in research and clinical settings. Blackwell and Currah (1973), Lovibond and Coste (1970), O'Leary and Wilson (1975), and Stewart (1975) have reviewed much of the literature in this area. Studies by Forsythe and Merrat (1969),
Kardash, Hillman and Werry (1968), McConghy (1969), Schaffer, Costello and Hill (1968) have shown imipramine to be significantly more effective than placebo in reducing wetting frequency. The dosages utilised vary from 25 mg for children around 5 years of age to 75 mg for older children. Even though imipramine has been shown to be superior to placebo and amphetamine, the percentage of children who actually achieved dryness is less than 30%. The effect of imipramine is generally noted in the first week or so, and it involves a reduction in the frequency of nocturnal wetting. Relapses following drug withdrawal are common, with various studies reporting 5 - 40% of the subjects maintaining continence. Schaffer et al (1968) found no difference between gradual and sudden withdrawal. Thus although the initial response to imipramine is rapid and encouraging, in majority of cases relapse occur after drug withdrawal (Turner, Rachman and Young, 1972).

Management of enuresis is a rewarding art, which requires an enthusiastic doctor who is willing to use a variety of different stratagems with confidence according to the particular needs of the child and the family. A contribution of empathy in sorting out simple family and social situations will cause immediate
cure in some children. For the rest, drugs may play a part though probably a small one. The effective drug dose is likely to cause side effects which vary considerably from child to child. The commonest reason for having to stop the drug is the onset of mood or sleep disturbance as the dose is increased.

By far the most studied drug in the past decade has been imipramine hydrochloride tablets (Tofranil). Dosage has ranged from one to three 25 mg tablets a day. The usual dosage for 6 to 12 years old is 25 mg., although some children may require as much as 75 mg. There is evidence that, if the child's wetting pattern demonstrates the likelihood of enuresis prior to 1 A.M., he should receive his medication around 3 P.M. If, however, enuresis is likely to occur after 1 A.M., the medication should be delayed until 8 P.M. For many adults and children one or two tablets taken at the hour of sleep will give good results. After 6 to 8 week period on the drug, it should be withdrawn over 4 weeks. At this time the result can be assessed in terms of whether the obtained dryness persists. If dryness does not persist, further trails with Tofranil or other antidepressants should be tried. However, a number of side effects can result from the use of tricyclic anti-depressants. These side effects can be handled by reduction or elimination of the drug.
Hence, the doctor prescribing drugs for enuresis knows that the
drug is unlikely to produce permanent cure; but suppression of
a troublesome symptom is a highly respectable pursuit for any
doctor, particularly when 14% of the patients are going to lose
that symptom permanently during ensuing years.

h. Hypnosis

Researchers have explored the use of hypnotherapy in the
treatment of enuresis for decades. Trance induction, heightened
suggestibility without trance induction, enhanced by antecedent
counselling regarding positive attitude, expectations and
motivations and self hypnosis are three paradigms in
hypnotherapy. Hypnotherapy may include a program of
statements that the child repeats; for example, "When I need to
urinate I will wake up all by myself, urinate in the toilet, and
return to my dry nice bed". Studies using hypnotherapy indicate
it is more successful in highly motivated patients, particularly
those who receive counselling to reinforce high expectations
and positive attitudes. Unfortunately data on the long term
efficacy of hypnotherapy are lacking. Further, the requirement
that child practice the self hypnosis technique several times a
day limits compliance with the program.
Hypnosis has been used in the treatment of enuresis in Europe and in the United States. Like all treatment methods in enuresis, there are enthusiastic claims and counter claims concerning success. Success may be related to the special quality of the treatment dyad in the hypnotherapeutic process. Even experienced hypnotherapists may have difficulty in hypnotizing young children. Also, in both adults and children the therapist must be expert in recognizing contraindications. For these reasons hypnosis and hypnotherapy methods of treatment for enuretics should be used only by practitioners much skilled in these processes.

i. Elimination Diets

It has been proposed that there is a relationship between food allergy and enuresis. However, hypoallergenic diets have produced remission in some children. Similarly eliminating milk products, citrus and chocolate, among other foods to which children are commonly allergic, may benefit some children. A recent study assessed the effect of an oligoantigenic diet on migraine and/or hyperkinetic behaviour in 164 children; 21 of the participants older than age 5 years also had enuresis. Dietary
intervention resulted in the resolution of enuresis in 12 of these children and improvement in 4; 2 of the 4 children experienced cure, and one child reported improvement. Upon reintroduction of foods, enuresis recurred in 8 of the 12 children. The foods most frequently associated with relapse were chocolate and citrus fruits; most children experienced relapse upon reintroduction of several foods rather than only one.

**j. Acupuncture**

Acupuncture emerged as a possible therapy for enuresis in 1986. A placebo-controlled study, conducted in Italy, examined the value of three modalities in the treatment of enuresis: administration of desmopressin acetate (DDAVP), acupuncture and a combination of DDAVP and acupuncture. Therapeutic efficacy was defined by percentage of dry nights. Children who received DDAVP or acupuncture alone experienced success in terms of achieving dryness; however the combination of DDAVP and acupuncture demonstrated the greatest effectiveness. Of all, 19 of the 40 children completed the investigation, underscoring the need for further study regarding the viability of acupuncture, either as primary or adjunctive therapy.
2. 6. INDIAN STUDIES ON ENURESIS

(1969) J.V. Khatri et al studied 120 cases of enuresis with wetting frequency of 5 times a week or more which were referred to their clinic. Children were of the ages between 3 and 10 with about half of them in the range of 3 and 6 years. 78% were primary enuretics. 60% had a family history of enuresis. 15 cases had various behavioral problems. Of the 81 cases studied, 43 had spina bifida occulta seen on the X-ray.

(1969) Baldev K. et al studied 118 children referred to their clinic on various parameters. The definition of enuresis used is not mentioned. Children were of the ages between 3 and 14 years. 18 cases were mentally retarded. A family history of enuresis was seen in 30% of cases. Various behavioral problems were seen in cases such as speech disorder, hyperkinesis, conduct and emotional disorder. The study concluded, "It may be that these cases (of primary enuresis) are the result of a slowly maturing neural apparatus.....".

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Pranesh Nigam et al reached the following conclusions in his study:

1. Enuresis was more frequent in boys (64.3%) as compared to girls (35.7%), and the incidence decreases as the age advances. The highest incidence (47.6%) was in the range of 4 - 6 years age group.

2. Enuresis was more commonly seen in children of middle (46.4%) and lower (33.3%) socio-economic groups. The children of parents with an educational status up to class V (57%) were more commonly affected.

3. Regular bed-wetters (60.7%) were more in number as compared to occasional bed-wetters (39.3%)

4. There was a greater prevalence of bed-wetting among later born children (72.8%) of large families. 11.6% of siblings had the history of bed-wetting

5. Enuretic children were apt to have a small bladder (bladder capacity of 190 - 250 ml) and would void frequently during the day.
A slightly higher percentage of recovery rate was noticed in regular bed-wetters when put on both psychotherapy and imipramine hydrochloride (80.9% i.e 17 out of 21) as compared to those receiving imipramine only (72.8% i.e 16 out of 22). The response to combined therapy in occasional bed-wetters was better (100%) as compared to imipramine which is only (90%).

P.C. Mishra et al found nocturnal enuresis in 67% of 83 children of whom 75 were primary. Besides, 6 parents were also enuretic. Behavioral problems were seen in 20 cases (as thumb sucking, nail biting, shyness). 20 cases had speech difficulties of which 9.6% had a delayed onset especially in primary enuretics.

Dr. N.R. Arun Kishore found that there is high incidence of enuresis in the families of enuretics. The enuretics have small
functional bladder volumes, score higher on the Panness, and their parents show specific pathogenic child rearing attitudes of over protectiveness and dominance.

It can be recapitulated from the various researches paraphrased above that not adequate work has been reported on enuresis, so far. Enuresis is a very common diagnosis in our country, and its prevalence is exceedingly exorbitant. The investigator, therefore, decided to concentrate on relatively less explored dimensions such as study of functional enuresis and its psycho-social correlates. Hence the "Study of some Psycho-Social Correlates of Functional Enuresis" was undertaken.