"It is perhaps natural that psychologists should awaken only slowly to the possibility that behavioural processes may be directly observed, or that they should only gradually put the older statistical and theoretical techniques in their proper perspective. But it is time to insist that science does not progress by carefully designed steps called "experiments" each of which has a well designed beginning and end. Science is a continuous and often a disorderly and accidental process. What the statistician means by the design of experiments is design which yields the kind of data to which his techniques are applicable."

B.F. Skinner, 1972
The word 'enuresis' is derived from the Greek word 'enourine' which means to void urine. A pathological connotation is not inherent in the derivation of the word. The major diagnostic qualifier relates to age onset. It is a common behavioural problem among children beyond five years of age. The definitive criteria for defining the condition have been included in the classification of Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (DSM-IV). DSM-IV classification states that enuresis is the repeated voiding of urine into clothes or bed, whether the voiding is involuntary or intentional. The behaviour must occur twice weekly for at least three months or must cause clinically significant distress or impairment socially or academically. The child's chronological age must be at least five years. The tenth revision of International Classification of Diseases & Related Health Problems (ICD-10) uses a cut-off age of four years after which wetting is considered pathological if other criteria are met. This study is guided by the stipulations as in DSM-IV.
Enuresis can be defined as persistent, uncontrolled passage of urine in the day or night in the absence of urological, neurological, and psychological pathology and beyond the age when most children are continent (Mckendry et al., 1975). Approximately 40% of children wet the bed at 3 years of age, 22% at 5 years, 10% at 10 years, and 3% at 15 years (Bindelglas, 1975). A recent survey of over 10,000 children in the USA reported somewhat higher prevalence rates of 33% at 5 years, 18% at 8 years, 7% at 11 years, and 7% at 17 years (Byrd et al., 1996). Some studies confirmed that the development of bladder control occurs in a stage wise manner in most children during the first five years of life (Fielding & Doleys, 1988; Buchanan, 1992; Shaffer, 1994). Girls develop bladder control more quickly than boys. The prevalence of nocturnal enuresis is estimated at approximately 7% of 8 year old, with a subsequent decrease of 1 percentage point per year. Boys outnumber girls by a ratio of 1.4:1. A Swedish study (Hellstrom, Hanson, & Hansson, 1990) has confirmed the ratio of boys
to girls for 7-year-old school entrants and has provided information on the frequency of other symptoms. Bed-wetting was monosymptomatic in 39% of girls and 59% of boys.

Enuresis is commonly classified as nocturnal and diurnal. Nocturnal enuresis occurs only while sleeping (afternoon naps included), whereas diurnal enuresis occurs when the child is awake. There seems to be a continuum between these two types of enuresis. The child with monosymptomatic nocturnal enuresis has achieved day time continence at a normal age, has excellent day time control, does not have frequency, urgency, hesitancy, or dysuria, and has a normal bladder capacity.

A number of factors have been proposed as causative of enuresis, including food allergies, deep sleep, small bladder capacity, developmental delays, and faulty training habits (Mckendry & Stewart, 1974; Cohen, 1975; Simonds, 1977; Rushton, 1993). However, no definitive cause has been identified. An indepth study of the research literature available on enuresis reveals that the disorder has multidimensional and complex
etiopathogenesis (Abraham, 1980; Warzak & Friman, 1994; Kalo & Bella, 1996; Sellinger, 1997; Rona Li & Chinn, 1997). Several factors interact to result into this pathological problem. So far, the factors that are found to be involved in the etiology of enuresis are: heredity (Simonds & Parraga, 1982; Moilanen & Jarvelin, 1987; Hjalmas, 1997), personality (Bissell, 1892; Moilanen & Jarvelin, 1987; Warzak & Friman, 1994), intelligence (Ackerson & Highlander, 1928), family characteristics of enuretic children (Richman, 1977; Moilanen & Jarvelin, 1987; Garralda & Bailey, 1987; Kalo & Bella, 1996; Rona, Li, & Chinn, 1997), socio-economic status (SES), or socio-cultural factors (Coons, 1957; Stoltz & Smith, 1959; Gupta, 1974; Malaviya, 1977; Christmanson & Lisper, 1982; Sarkar & Biswas, 1989; Adams et al., 1994; Wille & Anveden, 1995; Pugner & Holmes, 1997; Riley, 1997).

Etiological theories of enuretic problem fall into six categories: biological, developmental, psychopathological, psychodynamic, behavioural, and family systems.

Biological explanations of enuresis point to the importance of genetic and constitutional factors. A
positive history of enuresis among family members has been frequently noted. When both parents were enuretic, 77% of children are enuretic; when 1 parent was enuretic, 42% of children are enuretic; and when neither parent had a history of enuresis, only 15% of children are enuretic (Cohen, 1975). Findings concerning the role of biological factors in the etiology of enuresis and biological treatments of enuresis have been reviewed by Kaplan and Busner (1993), Shaffer (1994), and Barclay and Houts (1995). Approximately 70% of children with enuresis have a first-degree relative who has a history of bed-wetting, suggesting the importance of genetic factors in enuresis. Compared with other variables affecting psychological adjustment or physical health, the single major predictor of the outcome for children with enuresis is the number of first-degree relatives having similar problems. Enuresis has also been found to be associated with urinary tract infections, urinary tract abnormalities, a low functional bladder volume, and constipation. While antibiotic treatment may relieve urinary tract infections, it has little impact on enuresis. Surgery to rectify urinary tract
abnormalities is ineffective in alleviating enuresis.
Nocturnal enuresis is associated with an abnormal
vasopressin circadian rhythm. However, treatment of
enuresis with vasopressin (also known as DDAVP,
Desamino-D-Arginine) is effective in only minority of
cases and there is a high relapse rate (Kaplan & Busner,
1993). The observation that the anti-depressant
imipramine leads to immediate cessation of nocturnal
enuresis and its withdrawal leads to an immediate relapse
in most cases has led to speculation about abnormalities
of the neuroamine system contributing to the etiology of
enuresis. Anti-cholinergic drugs such as balladona,
propantheline, oxybutynin chloride and terodeilne delay
the desire to void and increase functional bladder
capacity. They have little effect on nocturnal enuresis but
are effective in reducing day-time wetting. However, all of
the anti-cholinergic drugs have unpleasant side effects
such as dry mouth, blurred vision, dizziness, headache,
and nausea.

Developmental hypotheses about the etiology of
elimination disorders view enuresis as part of a
delay in reaching normal developmental milestones, (Buchanan, 1992; Shaffer, 1994). Enuretic problem is more common among children with specific developmental delays, characterized by a failure to reach motor speech and social milestones on time, and minor neurological abnormalities. It is more common among children with general developmental delays, characterized by low IQ and a diagnosis of intellectual disability. Enuresis is more likely to develop in youngsters who do not begin toilet training until after 18 months.

Psychopathological hypotheses about the links between psychological adjustment and elimination problems fall into three categories. The first hypothesis is that an underlying psychopathology leads to the development of enuretic problem. The second hypothesis is that the enuretic problem places stress on the child and this leads to the development of psychological problems. The third hypothesis is that some underlying psychopathology gives rise to a range of behavioural difficulties of which enuretic problem is one subset (Shaffer, 1994). Research relevant to these three
hypotheses has been reviewed by Buchanan (1992) and Shaffer (1994). Clinically significant psychological problems are approximately four times more common among enuretics than among children with normal bladder control, and no specific diagnostic category is associated uniquely with enuretic problem. It has consistently been found that successful symptomatic treatment of enuretic problem leads to improvement in other behavioural and psychological problems. Thus, for a majority of children with enuretic problem, it is probably the case that enuretic problem is partially or completely responsible for the other observed psychological difficulties.

In psychodynamic theories wetting is explained as expression of unconscious intrapsychic conflicts which have their roots in non-optimal parent child relationship during the anal period of psychosexual development. Specifically, the parent may have been overly lax and negligent or overly coercive and controlling during the stage of development when toilet training is a central concern (Anthony, 1957). Negligence on the parent’s part,
according to this theory, may lead to suppressed aggression which finds expression in enuretic problems. Individual psychotherapy, play therapy, or art therapy, which aim to permit the child to express and resolve the conflicted feelings which underpin the enuretic problem, are the principal treatments to have arisen from the psychodynamic tradition. Outcome studies of such therapy have shown that it is rarely effective in helping youngsters develop bladder control (Kaplan & Busner, 1993). However, case reports suggest that psychodynamically oriented play and art therapy may be useful to help youngsters increase their self-esteem and self-efficacy beliefs where these have diminished due to the negative response of family, peers and teachers to the enuretic problem (Kelly, 1996).

Behavioural theories have highlighted the role of inappropriate reinforcement schedules in the development of enuresis (Fielding & Doleys, 1988). Furthermore, when appropriate toileting behaviours have occurred they have not been adequately reinforced. In addition, parental attention following wetting may inadvertently
reinforce such enuretic problem. There is also the possibility that unsuccessful attempts to resolve enuretic problem and the negative physical and psychological consequences of enuresis may lead to the development of learned helplessness and low self-efficacy beliefs (Sluckin, 1981). According to behavioural explanations of enuresis, treatment should focus on sensitising children to bodily sensations that precede urination and defecation so that these become effective discriminative stimuli.

Family systems theories of enuretic problem have focused on the roles of patterns of family interaction in the maintenance of elimination problems (White, 1984; Kelly, 1996). When enuretic problem develops, children may become triangulated into stressful patterns of interaction with their parents or care givers. Within such patterns one parent interacts with the child in an overactive, instructive manner, while the other adopts a critical and distant position with respect to the child. Parental disagreement about how to manage the enuretic problem are openly addressed but are detoured through the child. For the child to recover, the family must be helped to replace
these problem maintaining behaviour patterns with alternative ways of managing the enuretic difficulties that involve greater parental co-operation. A number of acute and chronic family stresses have been found to be associated with enuresis (Buchanan, 1992; Shaffer, 1994). Stressful life events, such as birth of a sibling, parental separation, disruptions of parental care, placement in institutional care, head injury, physical or sexual abuse, and exposure to natural disasters, may all precipitate the onset of enuresis. Enuresis is more common among children exposed to chronic stresses associated with a chaotic family environment, such as marital discord, parental adjustment problems (including criminality, chronic illness and chronic psychological problems), financial difficulties, and crowding. Taken together, these findings suggest that a chaotic family environment may predispose youngsters to have enuretic problem, probably because the routines required for developing bladder-control skills are not provided. These results also suggest that exposure to an acute family stress may disrupt well-established toileting habits.
Children may suffer both emotionally and socially as a consequence of nocturnal enuresis. For a proportion of parents, the emotional, practical, and financial demands of coping with their child's unrelenting bed-wetting can give rise to annoyance, anger, and intolerance (Butler, 1986, 1993, 1994).

It is difficult to determine the degree to which each of these factors contributes in enuretic problem of any particular child. Some of these are modifiable and some not. Therefore, a multidisciplinary approach by a team of academicians comprising child psychologists, clinicians, social-workers, and parents is needed to make an indepth study of the problem and suggest remedies about the management of this problem. This fact highlights the gravity and economic importance of the problem.

Enuresis may be a manifestation of family conflict and maladjustment e.g., too strict parents, rejection, sibling rivalry etc. An erratic handling of the problem by the parents causes further anxiety to the child. His condition therefore, gets more aggravated. Too late or improper training by the parents regarding the bladder
control is also an important factor in the causation of bed-wetting. Around age two, when toilet training begins for most children, fear of the toilet is not common. Fears of imaginary creatures, death, robbers, and being alone begin around fifteen months of age, tend to increase up to age four, and then show a steady decrease until age eleven when there is again an upsurge of fear (Mac Farlane et al., 1954). The clinical and experimental evidence clearly demonstrates that source and content of anxiety and fears change with age but begin to stabilize around age six.

It has been suggested that enuretic children have smaller functional bladder capacities as compared to non-enuretic children (Muellner, 1960; Cohen, 1975). Based on this assumption, urine retention training has been recommended as a treatment for enuresis (Starfield & Mellits, 1968). Retention control training generally involves having the child delay urination (when he or she feels the urge) for increasingly longer time intervals.
throughout the day upto a maximum duration of 30 minutes (Doleys et al., 1977). In addition, the child is instructed to stop and start his or her urine stream when voiding. With repeated practice, it is expected that the enuretic child will increase his or her bladder capacity and be able to sleep through the night without the need to void. Some clinicians have reported success in reducing the frequency of bed-wetting by retention control training (Starfield & Mellits, 1968; Kimmel & Kimmel, 1970; Paschalis et al., 1972).

Enuresis (bed-wetting) is not only a source of conflict between the child and the parents, but in later years of childhood it causes social isolation and a sense of inferiority in relation to peers. Thus, enuresis is a complex behavioural problem perplexing many parents and affecting the personal and social adjustment of such children. Heredity or physiological causes of the problem cannot be treated by psychological methods. But the environmental and personality factors contributing to
enuretic behaviour can be controlled and behaviour can be modified by scientific techniques of behaviour modification. Knowledge of these factors is of immense importance. There are some researches as cited above to demonstrate the role of various factors in causing enuresis but no conclusive results have been achieved so far. There are controversial results of researches on many factors, e.g. socio-economic status and intelligence. Moreover, comprehensive research on the personality characteristics of enuretic versus non-enuretic children has not been done especially in Indian context. In a pilot study by researcher (Mishra & Agarwal, 1996), marked differences in a personality characteristics of enuretic and non-enuretic children have been found. It has been concluded that personality characteristics like anxieties, conflicts, aggression, feeling of insecurity, need for love and protection, pessimism, contaminated thought process and uncontrolled drive are much more among enuretic children in comparison to their non-enuretic counterparts.
Further, the study shows no significant difference in the intelligence and SES (socio-economic status) of enuretic and non-enuretic children. There is a need of comprehensive analysis of the causes, particularly psychological and environmental, leading to enuresis among children. Such research in Indian social set up and particularly in the present fast changing techno-secular society is extremely important for the treatment of this behaviour. Hence, the present study is designed to analyse the causes of enuresis in present Indian social set up. This understanding will be of immense help in planning treatment of enuretic behaviour.

Children are most frequently brought for consultation because of behaviour problems. Often the 'sick' child is merely the identifiable patient in a situation where the real 'sickness' is a disorganized family structure, with tension between parents becoming evident in the problems of child. Some psychoanalysts have suggested that dreams of disturbed children are more approximately seen at
times as relating to the family situations than to the inner psychological state of child.

These considerations make it imperative that the child's problem be seen in the context of the entire family situation. Enuresis, for example, which is a frequent problem, may be indicative of an organic urinary dysfunction of a simple habit pattern, or of severe anxiety, or may reflect the child's unconscious expressions of anger at some family tension. It may also be a bid for special consideration and attention. At times, in fact, it is the family itself that should be treated with the expectation that the child will improve as family stresses are decreased.

Treatment of enuresis has been a great concern for pediatricians, clinical psychologists, and parents. A prompt treatment is essential otherwise the child may continue to have enuresis plus added emotional problems in adolescence. Numerous treatments for enuresis have been suggested, including diet restrictions, Psychotherapy, retention control training, drugs, and behavioural methods. Assuming that enuretics have a


smaller bladder capacity than non-enuretic children, it has been suggested that small bladder capacity may be due to spasms of the smooth muscle in the bladder wall. This spasm may have an allergic basis and, therefore, removal of substances that irritate the bladder wall may arrest enuresis.

It has been observed that a large number of enuretic children are taken to medical doctors for the treatment though it has been advised to treat enuresis with drugs only as a last resort in intractable cases causing serious socioemotional difficulties for the sufferer. Two types of pharmaceutical agents shown to be effective in treating nocturnal enuresis are tricyclic antidepressants and desmopressin (DDAVP). For more than three decades it has been known that tricyclic antidepressants reduce the frequency of night time wetting (Blackwell & Currah, 1973). A meta-analysis (Houts, Berman, & Abramson, 1994) estimated that 43% of children became dry on imipramine, but this is likely an underestimate because the study included many trials in which the dosage was probably too low. As with all pharmacotherapy, the effects
are symptomatic and not curative. Relapse is the rule once the drug is stopped. Because of its anticholinergic effect, it may be useful symptomatic treatment for children with small bladder capacity. Imipramine (Tofranil) is efficacious and has been approved for use in treating childhood enuresis primarily on a short-term basis. Esperanca and Gerrard (1968) have recommended the elimination of milk and dairy products, eggs, citrus fruits and juices, tomatoes and tomato products, coco and chocolate, carbonated beverages containing colouring agents, and other soft drinks for 50 enuretic children. Defining a cure as no more than one wet bed in two weeks, they found dietary restrictions to be effective in 15% of the cases. However, it is impossible to separate the effects of imipramine (drug treatment) and dietary restrictions as both treatments were used in the study. In general, dietary restrictions have been found to be effective with only a small percentage of enuretic children and have been suggested only for children with a history of allergies (Mckendry & Stewart, 1974; Mckendry et al., 1975; Perimutter, 1976). Initially upto 30% of enuretic
patients stay dry and up to 85% wet less frequently than before treatment. But once the drug is discontinued enuresis at former frequencies usually occurs within a few months of discontinuence of the drug. A serious problem is the drug's adverse effects which included cardiototoxicity. Desmopressin (DDAVP) antidiuretic compound that is available as an intranasal spray, has also shown some initial success in reducing enuresis (Rushton, 1993; Banerjee et al., 1993; Moffatt, 1997; Hansen & Jogensen, 1997; Caione et al., 1997). It was found in another study that the mean duration of successful intranasal desmopressin therapy was 6-7 months and the side effects were negligible (Riccabona, Oswald & Glauninger, 1998). Since the administration of drugs does not lead to permanent positive change in enuretic behaviour, it must be accompanied by some other more effective treatment plans. Practical changes should be suggested in the way that the problem is handled by the family, such as having the child launder his or her own bed linen, emptying the bladder before retiring, not drinking fluids after the dinner meal and using different
settings of an alarm clock to try to identify a time during the night when enuresis is more likely to occur.

Behaviour Modification techniques have been used to treat enuresis with considerable success, for example, appropriate toilet training and retention control training (Doleys & Wells, 1975; Bunyan, 1986), and dry bed training (Azrin et al., 1973 & 1974; William et al., 1978; Barmann et al., 1981; Griffiths et al., 1982). Classical conditioning with bell and pad apparatus, which is designed in such a way that the child wakes up as soon as he is about to wet the bed, is used by many psychologists (Werry & Cohrssen, 1965; Deleon & Mandell, 1966; Doleys et al., 1977; Finley et al., 1977; Fielding, 1980; Bellard & Nettlebeck, 1981; Doleys et al., 1981; Stanton, 1982; Wong & Luo, 1992). Short-term psychotherapy has been recommended by some clinicians for the treatment of enuresis (Sperling, 1965).

Some behaviour therapists have treated enuresis with psychotherapy and training in the form of reassurance to the parents and the child. Parents are asked to encourage the child in having dry nights. Infact,
they should offer special pat and even reward on occasions when the child does not wet the bed. Restrictions of too much of water and drinks at bed-time and insisting on his voiding before retiring, waking him up once or twice to void during night also help the enuretic child. There is a need of multimodal package of behaviour modification techniques for the treatment of enuresis which can be easily applied by parents under the guidance of clinical psychologist in the home/family setting, and hospital setting is not required. In the present study, a multimodal package of behaviour modification techniques is being designded with this consideration to suit the needs of common people in Indian society.

Many psychological and psychoanalytic theories regarding enuresis have been advanced but controlled studies have found that psychotherapy alone is not an effective treatment of enuresis. It may, however, be useful in dealing with the co-existing psychiatric problems and emotional and family difficulties that may be a cause or arise secondary to the disorder.
The above discussion leads to an important suggestion that there is a need for research to ascertain the relative efficacy of behaviour modification techniques alone, pharmacotherapy alone, and the combined use of both i.e. behaviour modification techniques and pharmacotherapy in the treatment of enuresis among children. The present study is designed to investigate this important issue.