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# Enuresis and Attention Deficit Disorder : A Possible Co-morbidity in Children

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## ABSTRACT

**Evidences of a possible relationship between enuresis and Attention Deficit Disorder (ADD) were examined in this work, for probable clinical directions and appropriate focus of treatment. With adoption of DSM-III-R diagnostic criteria, supplemented by suitable psychometric assessments, a degree of overlap could be identified between the two disorders in 2 (5.9%) of 34 enuretic subjects studied, whose ages were 9.3±6.6 years old. They had primary type of enuresis, of day and night frequencies, hyperactivity with moderate degree of ADD, as well as dull-average and borderline intellect. On the other side, only in one girl (14.3%) out of 7 children with ADD that enuresis was detected.**

**The study suggested existence of a substantial, though statistically insignificant, overlap in occurence of both disorders. Its evidence is wholly consistent with the view that maturational and/or arousal deficit might stand in etiological background of both disorders.**

**Study findings favoured more work on the relationship between enuresis, ADD and other psychiatric morbidities in children, particularly to investigate the potentials of new prospects in pharmacological and behavioural treatment of enuresis.**

## INTRODUCTION

Enuresis is one of the most commonly seen sphincteric distrubances, that adresses a distressing childhood sleep disorder for the child and family (Kales *et al.* 1987). It is thought to be a disorder of arousal by Halliday *et al.* (1987) and others. Its higher incidence in MZ than DZ twins as well as in relatives, its overpresentations in boys than girls (3:1, varies with age), and among below overage intelligence were observed by Kolvin *et al.* (1973). De Jonge (1973) included genetic, developmental, organic, and psycho-logical parameters in the causative factors. It appeared as " Special symptoms not elsewhere classified" in ICD-9 and as "Functional Enuresis" in category entitled "Elimination Disorders" in DSM-III-R. The opinion of Kolvin, *et al.* (1973) was that enuresis has no association with any specific psychiatric syndromes, except encorporesis. While Okasha *et al.* (1973) in their psychiatric survey of Egyptian enuretics could realise a subgroup of children with higher level of anxiety, depression, or both, who may respond to treatment with antidepressants. Verhulst *et al.* (1985) reported that the majority of enuretic children do not have coexisting mental disorder, but psychiatric disorders are twice as common in this group as general population, especially among girls. They also expressed that functional encorporesis, sleepwalking, and night terrors may be encountered with enuresis. Barker (1988) advocated that it may exist on its own or as part of another psychiatric disorders. Possible mechanisms of this coexistence by Bird and Harrison (1982) were that; same factors might produce both enuresis and psychiatric disorders, or enuresis could be secondary to psychiatric disorder, or psychiatric disorder would occur secondary to relative parental reaction to enuresis. Non-pharmacologic treatments are widely used with varying success rates, and drugs are usually indicated for secondary variants.

Attention Deficit Disorder (ADD) is a chronic heterogenous condition of unknown etiology, which affects 3-5% of school age children, mostly boys (Biederman, *et al.* 1986). Okasha and Mikhail (1975) recorded its incidence as hyperkinetic syndrome in Egyptian children aged 6-12 years to be 0.5%, 10 times more in boys. But Munir *et al.* (1987) stated that although ADD is recognized as a common cause of pediatric, neurological, and child psychiatric referrals, its exact prevalence has been difficult to ascertain because of ambiguous diagnostic criteria and methodological problems. The DSM-III has improved operational criteria of its diagnosis and has facilitated more homogenous sampling and better diagnostic certainity (Barker, 1988). It may be identifiable in very young children, although frequently come to professional attention where the child enters school, and it may persist into adolescence and young adulthood (Okasha, 1988). Biederman, *et al.* (1986) found morbidity risk of ADD of 31.5% in first degree relatives of ADD propositional, markedly higher than 5.7% observed for the control group, and concluded that ADD is a familial. They added that ADD is also associated with increased familial risk of other psychiatric disorders as oppositional and major depressive disorders. Pliszka (1987) confirmed that subjects with ADD can varyj in the degree of conduct disorder, anxiety, and depressive symptoms. He conducted that overall stimulants appeared to produce greater changes on behaviour rating scales, clinical global impressions, and objective cognitive functioning measures of these children, but regarded the use of tricyclic antidepressants to be effective for highly anxious ADD children or if associated with evening hours behavioural problems.

**Aim of this work:**

The commoness of co-morbidity in children and adolescent psychiatry is becoming increasingly recognized. Older practitioners, as Schowatter (1989) said, were trained with an emphasis on "either/or" for diagnosis. Enuresis and ADD were noticed to share many epidemiologic, physiologic, and clinical similarities. They are more likely seen as disorders of arousal and both disorders usually cease by odolescence, suggesting a role of a maturational process. The realization of the frequency of co-morbidity would raise a host for new questions about etiology, treatment, and prognosis of enuresis and ADD. In addition, such comorbiditie, if verified, should never be overlooked by clinicians in their practice.

## SUBJECTS AND METHODS

37 enuretic subjects were selected for the current study on the basis of diagnostic criteria of DSM-III-R, where 3 children having clinical epilepsy, childhood-onset diabetes mellitus, and chronic urinary tract infection were excluded. By definition, their ages must be more than 5 years, and they ranged from 6-17 years with a mean of 9.3 $\pm$ 6.6 years. 8 (23.5%) were females, and 26 (76.5%) were males. Another 7 children with AD-HD diagnosis according to DSM-III-R were also included. 6 were males (85.7%), and 1 only was agirl (14.3%). Their ages were between 5-13 years old with a mean of 7.5 $\pm$ 4.7 years. The little number of the study sample was governed by the relative presentations of cases of ADD or enuretic children in a general psychiatric, neurology, and urology out-patient clinics over the pariod of the study 16 months).

All subjects have completed psychiatric, neurological, medical, and urological clinical assessments. Routine laboratory investigations were performed including; complete urine and stool analysis, E.S.R., and random blood glucose level, and F.B.S. as well as P.P.B.S. if necessary. Lumbo-sacral plain x-ray, and intravenous urography (I.V.U.) were carried out to suspected cases, while E.E.G. was

done to all cases. Psychological evaluation consisted of digit span forward and backward, as well as digit symbol test (in its two forms for those below or above 8 years old) for sustained attention and attention speed. I.O. was estimated according to cases with; social maturity, draw-a person, WISC, or WAIS.

Though treatment is not the domain of the present work, it is worthy to note that 82. 4% of enuretic group, and 66. 7% of ADD group recieved drugs as: tricyclic antidepressants, atropine, anticonvulsants, lithium, or neuroleptics, sometimes with bladder control training. Some showed improved frequencies and others had recurrences.

## RESULTS

Among 34 enuretic subjects, 13 (38.2%) were having primary enuresis, compared to 21 (61.8%) with secondary enuresis (Table I), ($Z = 0.98$, $p > 0.05$, statistically insignificant). 5 (14.7%) had diurnal and nocturnal (D/N) frequencies, 29 (85.3%) experienced nightly frequencies, and none showed diurnal frequencies only ($Z = 1.42$, $p > 0.05$, satistically insignificant). 6 (17.6%) manifested hyperactivity as a symptom, but 2 (5.9%) merely fulfilled DSM-III-R criteria for Attention Deficit-Hyperactivity Disorder (AD-HD), and none accepted criteria for undifferentiated ADD. ($Z = 4.23$, $p < 0.05$, statistically significant in favour of occurrence of non AD-HD). The other 4 were not considered as ADD due to the presence of a pervasive develop-mental disorder with early childhood onset in one, and only mild and moderate mental retardation (60, 52, 45) in other three. Enuresis was associated with encorporesis in 3 of these 4, but in none of the two subjects with AD-HD.

The two cases with enuresis/ AD-HD were males, aged 6, 9 7/12 years old, had moderate degrees of AD-HD, primary type of enuresis with D/N frequencies, which gained family's attention first before inattention, hyperactivity, and impulsivity, so that temporal relation between enuresis and AD-HD could not be guaranteed. Both cases had no family history of enuresis, nor sleep walking, one of them had history of childhood bronchial asthma, delayed dentition, and the other had past history of middle ear disease.

TABLE I

*Clinical Characteristics of Enuretic Group (no=34)*

| | | | |
|---|---|---|---|
| Type of enuresis | Primary | 13 | 38.2 |
| | Secondary | 21 | 61.8 |
| Frequency of enuresis | Diurnal | -- | -- |
| | D/N | 5 | 14.7 |
| | Nocturnal | 29 | 85.3 |
| Attention Deficit & Hyperactivity | No ADD, H. | 28 | 82.3 |
| | Hyperactivity | 4 | 11.7 |
| | AD-HD | 2 | 5.9 |

**TABLE II**

*Psychometric Assessments of Enuretic Group (no = 34)*

| | With AD-HD (no = 2) | | Without AD-HD (no = 32) | | t | p |
|---|---|---|---|---|---|---|
| I. Q. | 76 ± | 5.7 | 70.20 ± | 7.60 | 1.05 > | 0.05 |
| Dig. Span F. & B. | 4.5 ± | 0.71 | 7.62 ± | 3.23 | 1.19 > | 0.05 |
| Dig. Symbol Test | 4.7 ± | 1.58 | 8.41 ± | 2.77 | 1.86 > | 0.05 |

Mildly retarded physical growth was noticed in one, and no definite neurological abnormatlities were evident in both. EEGs showed sharp waves and and spikes in one (? subclinical epilepsy), and was normal for age in the other.

Psychometric evaluation denoted that both subjects fall into borderline and dull-average category of intelligence (72, 80, mean = 76 ± 5.7), and confirmed the diagnosis of ADD with digit span forward and backward (4.5 ± 0.71) and digit symbol test (4.7 ± 1.58) (Table II).

Criteria for the presence of other clinical categories overlapped with enuresis in the other 32 enuretic subjects were recorded as; mild depressive disorder not elsewhere classified (6 cases), mild or moderate mental retardation (6 cases), separation anxiety disorder (4 cases), dysthymic disorder (2), overanxious disorder (2), dream anxiety disorder (2), adjustment disorder with mixed disturbance of emotions and conduct (3), parasomnia not elsewhere specified (sleep talking & walking) (1), hypochondriasis (1), developmental expressive language disorder (1), and pervasive developmental disorder of early childhood onset (1). Sharp categorization was actually difficult.

On the other side, only one girl (14. 3%) aged 13 years old with moderate degree of ADD, had enuresis among those 7 subjects with AD-HD (Z = 0.49, p > 0.05, s. Insig.). She underwent fair developmental history and had irrelevant past and family histories. Her E.E.G. recording was within normal and was classified as having dullaverage (84) I.Q. level. Her enuretic condition was mainly nocturnal, occurs at one or twice weekly frequency, of primary type, and was neither associated with encopresis, nor sleep-walking.

At least one additional diagnosis was detected in 3 (42. 9%) cases with ADD (e.g. organic mood disorder, simple phobia, borderline I.Q.). EEGs for the ADD group failed to reveal specific pathological findings, I.Q. for the whole group was 73.6 ± 9.2, Digit Span forward and backward (4. 59 ± 2. 07), and Digit Symbol test (4. 34 ± 2. 11).

## DISCUSSION

Despite that the status of ADD as a diagnostically unique disorder is unclear, the use of DSM-III-R criteria for diagnosis of ADD in either groups could avoid the argumental evidences raised by King and Young (1982), Edelbrock, etal. (1984), and Lahey, *et al.* (1984), who found that AD-HD and undifferentiated ADD (without hyperactivity) are dissimilar disorders and should not be considered subtypes of the same disorder as AD-HD children tend to show aggressive conduct, lack of guilt feelings, and more

bizarre behaviour, while ADD without hyperactivity children were found to be anxious, sluggish, drowsy, shy, and socially isolated. They also added that both subtypes described evidences of depression and poor self-concepts.

Accordingly, the simultaneous occurrence of enuresis and ADD in the study sample will not be a diagnostic artifact due to unprecise diagnostic criteria.The presence of other DSM-III-R diagnoses in subjects of either enuretic group, or ADD group in the results of the present work reflects firstly the unavoidable classification of psychiatric disorders on symptomatologic, and not etiologic background, and secondly, the clinical perplexity of the cause-effect relationship hypothesized, although it was expected from other studies of Verhulst *et al.* (1985), Barker (1988), and Pliszka (1987).

**Enuresis and ADD: Is there an interrelationship ?**

The clinical overlap between enuresis and ADD achieved in 5.9% of enuretic children and 14.3% of children with ADD of the study sample, though it Is substantial, is insignificant statistically. The sample of enuretic group when compared with that diagnosed as having AD-HD for age, ($t = 0.62$, $p < 0.05$, satistically insignificant), both were harmoniously matched. At these ages, the overlap might stem from a maturational defect, most probably causing an arousal problem. Prevalence of primary type of enuresis in both groups gives support to this proposition. Other possibilities proposed by Bird and Harrison (1982) that enuresis might be secondary to ADD, or ADD could be due to children distress and their family reactions, were difficult to ascertain from the accumulated clinical data. But absence of morbidity risks in relatives of both groups, neurological and medical etiologic factors, add to the difficulty of inter-relating the two disorders. Further studies are hoped to develop more specified exploration of such observed clinical relation. The problem of unsetteled etiology of both disorders may be the fruitful target of such studies. More needs to know about brain cellular dysfunctions in enuresis and ADD is necessary to justify satisfactory and demonstrable relationship, for example: the use of sleep-EEG, BEAM to study functions of different brain areas, abnormal trace elements, and glucose or oxygen cellular consumption.

**Enuresis and ADD: which comes first ? and what should be treated?...**

are now reasonable questions laid by the current study, which deserve more works.

It is important to adopt an optimistic outlook while treating cases of primary enuresis, especially poor respondants. If it is associated with AD-HD, oligoantigenic diet used by Egger, *et al.* (1985), methylphenidate or amphetamines as cerebral stimulants tried by Douglas, *et al.* (1986), and Weiss (1981) respectively, clonidine related by Hunt, *et al.* (1985), brain metabolic enhancers, piracetam or pyrrolidine acetamide attempted by Bopucharlet and Ratel (1973), Pogady *et al* . (1977), and Krupnova (1985), or a combination of more than one of them may ameliorate such conditions of enuresis with AD-HD. Taylor (1980) denoted that focussing and sustained attention are probably, to some extent learned skills, which are likely to be impaired in disorganized and unstable families. Such an environment could also yield defective toilet training. There has been little research into exactly how this happens (Barker, 1988), but deeper family dynamics in future studies might clear this aspect, and helps in non-pharmacologic treatment of enuresis associated with AD-HD. As a ward of warning, it is a caution that in order to diagnose both disorders, there is a real possibility of overlooking a causative factor or misdiagnosing an organic disease, particularly in cases of primary enuresis.

## RECOMMENDATIONS

The authors recommend an eclectic approach for diagnosing and treating enuretic children, especially of the primary type, in order to establish diagnostic subcategories, avoid overlooking combined etiologic influences, and combine various effective treatment frameworks. In cases of primary enuresis, and more if other psychiatric symptoms and signs have arisen, the child psychiatrists, neurologists, pediatricians, and urologists are advised to have careful history taking, complete examinations, as well as thorough suitable investigations to assure correct diagnosis and successful management.

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## ABSTRAIT

### Enuresis et le désordre d'attention déficite Une Co - morbidité possible chez les enfants

Les preuves d'une relation possible entre **enuresis** et le désordre d'attention déficite (ADD) ont été examinées dans Ce travail pour les directions cliniques probables et le foyer approprié du traitement. En adoptant les critéres du DSM-III-R supplémentés des évaluations psychomètriques convenables, un degré de chevauchement a pu être identifié entre les deux désordres dans 2 (5.9%) de 34 sujets **enuretic** étudiés, agés de 9.3+6.6 ans. It avaient le type premier de enuresis, des fréquences du jour et nuit, hyperactivité avec le désordre d'attention déficite d'un degré moyen, aussi qu'un dégré d'intélligence juste moyenne et limite.

De l'autre côté, seule une fille (14.3%) de 7 enfants ayant le désordre d'attention déficite dans laquelle enuresis été découvert.

L'édude suggéte l'existence d'un chevauchement substantiel, malgré qu'il est stastisticalement insignificatif, dans l'événement des deux désordres.

Son évidence est totalement conséquent avec l'opinion que le déficit maturationel et / au révellant peut rester au fond étiologique des deux désordres.

Les trauvaille de l'étude ont favorisé plus de travail sur la relation entre **enuresis**, le désordre d'attention déficite et le autres morbidités psychiatrique chez les enfants, spécialement pour examiner les patentiels des points de vue nouvaux dans le traitement pharmacologique et conduitaire de **enuresis.**

# الموجز

## احتمال تراكب سلس البول واضطراب عجز الانتباه فى الاطفال

تم فحص الدلائل على احتمال وجود علاقة اشتراك بين حدوث سلس البول واضطراب عجز الانتباه عند الاطفال، حيث يتيح ذلك أساسا للاعتقاد بفائدة سريرية وعلاجية.

وباتخاذ المحكات التشخيصية بدليل التشخيص الامريكى الثالث المعدل للاضطرابات النفسية معضدة بتقديرات القياسات النفسية المناسبة، أمكن التعرف على وجود درجة من التراكب بين هذين النوعين من الاضطرابات فى حالتين (٥,٩٪) من بين ٣٤ طفلا فى عمر ٩,٣ ± ٦,٦ سنة، يعانون من سلس البول تمت دراستهم. أظهر هذان الطفلان وجود سلس بول أولى ذو تواتر نهارى وليلى، مع درجة متوسطة من اضطراب عجز الانتباه المصحوب بفرط النشاط، بالاضافة الى تمتعهما بمستوى من الذكاء فى الحد الفاصل وأقل من المتوسط قليلا.

وعلى الجانب الآخر، تزامل وجود الاضطرابين فى طفلة واحدة (١٤,٣٪) من بين ٧ أطفال يعانون من اضطراب عجز الانتباه.

اقترحت الدراسة احتمال تراكب الاضطرابين برغم عدم وجود دلالة احصائية لذلك من خلال العمل الراهن، حيث يتمشى هذا التراكب مع وجهة النظر القائلة بوجود عجز فى مسار النضج أو عملية الحث بالمخ أوكليهما، تفسر منشأ هذين الاضطرابين. وأيدت تواصل أعمال أخرى من شأنها استنباط العلاقة بين سلس البول واضطراب عجز الانتباه وكذا الاضطرابات النفسية الأخرى لاستقصاء امكانات الاجتهاد الأفضل فى العلاج العقاقيرى والمسلكى لسلس البول.