CHAPTER III

REVIEW OF LITERATURE

RESEARCHES ABOUT PREVALENCE OF ADHD
RESEARCHES ABOUT ETIOLOGY OF ADHD
RESEARCHES ABOUT TREATMENT OF ADHD
INTRODUCTION

Review of literature helps to get an idea about the variables which are conceptually and practically important in the related fields. There is a vast literature in the ADHD field, and currently there are various approaches towards the estimate of prevalence and treatment of ADHD. In this chapter a brief of review of the studies conducted are presented. The present review includes studies focusing on prevalence rate, etiology and various treatment of ADHD.

3.1. RESEARCHES ABOUT PREVALENCE OF ADHD

A study was conducted on Attention deficit disorder with hyperactivity among paediatric outpatients by Bathia M.S and Nigam V.R and Bohra N, Malik S.C in the Department of Psychiatry, University College of Medical Sciences, Delhi, India. Out of 1,000 children (aged 3-12 years) screened in a pediatric outpatient department over a 3 1/2-year period, 112 were found to have attention deficit disorder with hyperactivity (ADHD). The prevalence of ADHD increased with age, from 5.2% in those aged 3-4 years, up to 29.2% in those aged 11-12 years. There were four times as many boys as girls with ADHD. ADHD was most common in first born children and those from a lower social class. Children with ADHD had a higher rate of complications during pregnancy and delivery relative to a comparison group. Delayed development, temper-tantrums, enuresis, tics, broken homes, persistent parental
discord and psychiatric illness in parents were all more common in children with ADHD than in the comparison group.

Prevalence figures of ADHD were found in a number of state department documents and are reported below. The news department of School Education document, Talk, Time, Teamwork: Collaborative Management of Students with ADHD (1995) states in the resource sheet: Support Statement for School Personnel, that: “It appears that between 5% and 10% of school-aged children display attentional problems” (NSW Department of School Education, 1995, p. 2.).

Prevalence figures for the United States are similarly varied. Prevalence ranges from 3% and 23% (Barkley, 1998; Shaywitz & Shaywitz, 1988), and between 7% and 10% (American Academy of Pediatrics, 2000). It is also noted that prevalence rates vary significantly depending on whether they reflect school samples (6.9%) or community samples (10.3%) (American Academy of Pediatrics, 2000). Estimates of the incidence of ADHD vary in the research literature. Australian figures are quoted at between 1% and 6% (National Health & Medical Research Council (NHMRC 1997).

The Prevalence of attention deficit disorder among preschool age children was studied in India by Suvarna B.S and komatha (2000) in the Department of Pharmacology, Melaka Manipal Medical College, India. This study was performed to determine the prevalence rate of ADHD in preschool age children in kindergartens of south west, Mumbai. One thousand two hundred fifty (599 males and 651 females) children aged between 4-6 years,
were selected from 40 kindergartens in 6 localities in south west Mumbai. The Conner's index questionnaire was completed for each child by teachers and parents. Parents of children whose scores were positive for ADHD (>15) were interviewed by a psychiatrist and the ADHD was diagnosed based on DSM-IV criteria Schedule for affective disorders. One hundred fifty two (12.2%) children were diagnosed to have ADHD. The prevalence of ADHD in preschool age school in south west of Mumbai is consistent with previous studies in other countries. This study recommends the need for diagnosis and treatment of ADHD in preschool age children.

In Shiraz city the capital of Fars state in Iran, Alishahi & Dehbozorgi and Dehghan (2001) have done research about the prevalence rate of ADHD in school children. 2182 primary school students including 1082 boys and 1099 girls were selected randomly. The results show that the general prevalence of ADHD has been 5.82%, which consists of 1.14% inattentive subtype, 0.45% hyperactive impulsive subtype and 4.21% combined subtype. Also the results show that there is a significant difference between boys (8.49%) and girls (3.18%) (P<0.001). There was a significant difference in academic function of those who were affected by ADHD and those who were not affected by this disorder (P<0.001) and it was lower in the suffering group. There was a significant difference in discipline grade between two groups (P<0.001). ADHD group received lower grades. Because of the high prevalence of ADHD among primary school students and its undesirable outcome, the study recommends preventive Mental Health program.
A study on prevalence of ADHD in primary school students in Tehran is title of a research that has been done in capital of Iran by K. Khushabi, H. Pour-Etemad, M. Mohammadi, and P. Mohammadkhani (2003), to assess of the prevalence of children with ADHD in Tehran. A sample of 2667 children including both boys & girls aged between 7-12 years were selected by a 2-stage sampling method among a grid of sectors of 19 different educational areas by stratified random sampling. They tested the rate of ADHD in the considered children based on two questionnaires of Conner’s Parent and Teacher Rating Scales (CPRS and CTRS) and semi-structured interviews. According to the recent studies, it is possible to describe the rate of ADHD prevalence based on the CPRS and CTRS questionnaires and semi structured interview among the primary school children in Tehran (aged between 7-12 years of age) with a range of 3% to 6%. The mentioned findings of the study are somewhat similar to the announced statistics of the American Psychiatric Association (APA, 2003). A Survey on Prevalence Rate Among Male Subjects in Elementary School (7 to 9 Years Old) in Iran has been done by Ali Talaei & Naghmeh Mokhber and Ets (2005). This study listed all the schools in Mashhad city in Iran and chose 12, including 24 classes and 714 students by stratified cluster sampling. A total of 72 children were selected randomly for pilot study. Their parents and teachers filled the 10-item Conners’ questionnaire for ADHD separately. A total of 109 students out of 714 schoolboys had ADHD (15.27% ± 2.64%). The subgroups’ prevalence rates were as follows: Attention deficit (AD) = 4.62%, hyperactive impulsive (HI) = 5.32%, and combined type
(CT)=5.32%. Another study was done on school children by Ali Moradi & Mehdi Khabbaz and Tahmineh (2006) in Nishaboor city. Results showed that Prevalence of ADHD was 12.5%, CI 95%: 10–14.8%. There was no significant difference in gender distribution. The prevalence of ADHD had a significant rise with age (P<0.05). The highest prevalence was in spring born and the lowest was in the summer born school children (P<0.05). The prevalence of ADHD had a significant relationship with father’s education and was lower in students whose father had higher educations (P<0.05). Variables such as type of delivery, parity, mother’s education had no significant relationship with the prevalence of ADHD.

Prevalence, recognition, and treatment of attention-deficit/hyperactivity disorder in a national sample of US children (Froehlich T.E and Lanphear, B.P Epstein 2007) shows that of the sample, 8.7% met DSM-IV criteria for ADHD. The poorest children (lowest quartile) were more likely than the wealthiest (highest quartile) to fulfill criteria for ADHD (adjusted odds ratio [AOR], 2.3; 95% confidence interval (CI 1.4–3.9). Among children meeting DSM-IV ADHD criteria, 47.9% had a prior diagnosis of ADHD and 32.0% were treated consistently with ADHD medications during the previous year. Girls were less likely than boys to have their disorder identified (AOR, 0.3; 95% CI, 0.1–0.8), and the wealthiest children were more likely than the poorest to receive regular medication treatment (AOR, 3.4; 95% CI, 1.3–9.1). In US children aged 8 to 15 years, 8.7%, an estimated 2.4 million, meet DSM-IV criteria for ADHD. Less than half of children meeting DSM-IV criteria report
receiving either a diagnosis of ADHD or regular medication treatment. Poor children are most likely to meet criteria for ADHD yet are least likely to receive consistent pharmacotherapy.

The prevalence features of attention deficit hyperactivity disorder (ADHD) in children with intellectual disabilities (ID) in Irish schools is unknown. Buckley S, Hillary J, Gueren S (2008) in the research about prevalence of ADHD in Ireland examined the prevalence of features of ADHD in a special school, in order to ascertain the number of children who may need further assessment for ADHD. The study also explores the reliability of the Conners Teachers Rating Scale in this population. All teachers in a special school for children with ID were asked to complete the Conners Teachers Rating Scale and the Attention-Distractibility, Inhibition-Excitation Classroom Assessment Rating Scale, for those children whose parents had consented for them to take part in this study. Consent was obtained for 84 children a response rate of 71%, between the ages of 5 and 18 (mean = 10.5 years; SD = 3.7) The Conners Teachers Rating Scale was found to be internally reliable and had a normal distribution with the results. Overall, 55.9% of participants (47/84) had markedly elevated scores (T > 69) for at least one of the target subscales, which were the 'Hyperactivity', 'Inattention' and the 'ADHD Index' subscales of the Conners Teachers Rating Scales. In addition, the findings would suggest that the Conners Teachers Rating Scale can be a useful screening tool in the population of school children with ID. This study suggests that ADHD may be under diagnosed in children with ID. This has practical implications for the
mental health needs of these children. It is recommended that further studies are carried out to determine the prevalence of ADHD in this population.

In addition the document states: “it is generally agreed that the disorder occurs more frequently in boys than girls with ratios ranging from 3:1 to 9:1” (John V. Lavigne & Helen J. Binns, 2009) Few studies have examined the epidemiology of preschoolers' psychopathology. A study by Lavigne, JV and Lebaily SA (2009) included 796, 4-year-old children recruited from schools and pediatric practices in a diverse, urban area. Psychiatric disorder was assessed by a structured interview adapted for preschool children and by questionnaire. The most common disorders were oppositional defiant disorder (ODD) and attention deficit hyperactivity disorder (ADHD). Generalized anxiety disorder (GAD) and depressive disorders were reported in less than 1% of the sample. Race/ethnicity differences were not significant. Gender differences showed ADHD-inattentive type more common among boys, with no gender differences for GAD, major depressive disorder, dysthymia, separation anxiety disorder, or ODD at any level of impairment. The overall comorbidity rate was 6.4%. Approximately 3% of individuals receiving a diagnosis had received mental health services.

Sheppard, B and Chavira D, Azzam.(2010) in Department of Psychiatry, University of California, San Francisco, USA has announced that in total, 11.8% met criteria for definite ADHD, whereas an additional 8.6% had probable or definite ADHD (total=20.4%). In total, 41.9% of participants with ADHD also had behavior compared to 29.2% of participants without ADHD.
Hoardings was the only demographic or clinical variable independently associated with ADHD (odds ratio=9.54, P<0.0001). ADHD rates were elevated in this sample of individuals with childhood-onset OCD compared to the general population rate of ADHD, and there was a strong association between ADHD and clinically significant hoarding behavior. This association is consistent with recent studies suggesting that individuals with hoarding may exhibit substantial executive functioning impairments and/or abnormalities, including attentional problems.

3.2. RESEARCHES ABOUT ETIOLOGY OF ADHD

Nadine A DeWolfe, Joseph M Byrne, and Harry N Bawden (2000) correlated a study in 25 ADHD preschool children in (21 males, 4 females; mean age 4.8 years) with attention-deficit-hyperactivity disorder (ADHD) and 25 typically developing children (21 males, 4 females; mean age 4.9 years). Parental ratings of the preschool children and preschool child self-ratings were examined within the framework of three domains: behavioral disturbance, social competence, and familial environment. Compared to their typically developing peers, preschool children classified as having ADHD were rated by their parents as significantly more aggressive, more demanding of parental time, less socially skilled, less adaptable to change in routine, and as exhibiting more non-compliance. In contrast to these parental ratings, preschool children with ADHD perceived themselves as equally competent, and as socially accepted as their peers. Parents of preschool children with ADHD rated themselves as less competent parents, and as experiencing a restricted
parenting role. Although parenting a preschool child with ADHD was viewed as stressful, the parents did not rate general family functioning to be adversely affected.

Gail Tripp and Jeff R. (2000) at Okinawa of Japan and Dunedin of New Zealand have studied the changes in dopamine signaling which may account for altered sensitivity to positive reinforcement in children with ADHD. It is proposed that in children with ADHD there is diminished anticipatory dopamine cell firing, which is treated as dopamine transfer deficit (DTD). The DTD theory leads to specific and testable predictions for human and animal research.

Ahmad-Ali Noorbala and Shahin Akhondzadeh (2006) in Psychiatric Research Center, Roozbeh Psychiatric Hospital, Tehran University of Medical Sciences, in Iran, have studied “Attention-Deficit/Hyperactivity Disorder: Etiology and Pharmacotherapy” Result show that the etiology of attention-deficit/hyperactivity disorder is not well understood. Neurochemical studies suggest, alterations in catecholaminergic, mainly dopaminergic and noradrenergic, transmitter functions markedly contribute to the symptoms of this disorder. The symptoms of attention-deficit/hyperactivity disorder are significantly ameliorated by the agents that specifically influence these neurotransmitters. Animal studies implicate areas of the brain in which these neurotransmitters are most dominant. Psychostimulant medications are generally the first choice in the treatment of attention-deficit/hyperactivity disorder. Approximately 70% of the children treated show improvement in the
primary attention-deficit/hyperactivity disorder symptoms and in comorbidity such as conduct disorder, although the benefits may not hold beyond two years. Despite the well-established efficacy and safety of stimulants for attention-deficit/hyperactivity disorder, alternative medicines are still needed for several reasons. About 30% of children and adolescents with this disorder may not respond to stimulants or may be unable to tolerate potential adverse events such as decreased appetite, mood lability and sleep disturbances. Although stimulants do not increase the risk for later substance abuse in attention-deficit/hyperactivity disorder, concerns have been raised about special prescription rules and a potential for abuse by persons other than the attention-deficit/hyperactivity disorder subjects.

3.3. RESEARCHES ON TREATMENT OF ADHD

Daryl Efron, Frederick Jarman, and Melinda Barker (1997) at the Centre for Community Child Health and Ambulatory Pediatrics, Royal Children's Hospital, Melbourne, Victoria, Australia, compared the side effect profile of methylphenidate (MPH) and dexamphetamine (DEX) in children with attention deficit hyperactivity disorder (ADHD). They found that DEX caused more severe insomnia and appetite suppression compared with the baseline rating. Appetite suppression was the only item rated more severe on MPH than at baseline. Six side effects were significantly more severe on DEX than MPH: insomnia, irritability, proneness to crying, anxiousness, sadness/unhappiness, and nightmares. None were more severe on MPH than DEX. Overall, both MPH and DEX were well tolerated by most subjects, with
only four subjects discontinuing the trial period because of severe adverse effects (2 [1.6%] on each stimulant. Many symptoms commonly attributed to stimulant medication are actually preexisting characteristics of children with ADHD and improve with stimulant treatment. Of the doses investigated, both DEX and MPH caused appetite suppression, and DEX caused insomnia. Negative emotional symptoms were more severe on DEX than MPH.

James B. Hale & Jo-Ann B. Hoeppner (2000) Conducted a study and have evaluated Medication Response in ADHD. Although evidence supports the use of double-blind placebo medication trials to evaluate methylphenidate (MPH) effects on the core behavioral symptoms of attention-deficit/hyperactivity disorder (ADHD), few studies have demonstrated their utility in examining MPH effects on the cognitive deficits associated with ADHD. This article presents a technique for evaluating behavioral and cognitive dose-response relationships at the single-subject level of analysis. Case study results and multivariate analyses suggest that systematic evaluation of behavioral and cognitive MPH dose-response relationships could lead to more accurate MPH titration and greater long-term multimodal treatment efficacy.

Susan Hansen, Karen Meissler and Richard Ovens in Mental Health Department (2000) studied a group play therapy model designed for youth that present with Attention Deficit Disorder/Attention-Deficit/Hyperactivity Disorder (ADD/ADHD) symptomatology. These symptoms include, but are not limited to impulsivity, disruptive behaviors, social skill deficits as well as
ineffective communication skills. This model, unlike current deficit, psychoeducational models, is based in a play therapy, process-oriented framework. The model utilizes concepts from attribution theory as well as social learning theory to assist in skill enhancement and practical social experience. The research on this program demonstrated a positive impact showing a significant increase in self-esteem, which ultimately allowed for a heightened level of functioning and overall increased ability to engage in socially acceptable behavior.

S Janatian, A Nouri, A Shafti, H Molavi, H Samavatyan,( 2001) have done a study on Effectiveness of play therapy, on the bases of cognitive behavior approach on severity of symptoms of Attention Deficit/Hyperactivity Disorder (ADHD) among primary school male students aged 9-11 year. Result indicate that ADHD was considered as the most prevalent disorder during childhood and adolescence. For the purposes of diagnosis and treatment various methods including play therapy was applied. This research has been conducted with the aim of studying the effectiveness of play therapy on severity of symptoms of Attention Deficit/ Hyperactivity Disorder among primary school male students aged 9-11 By considering a experimental design two psychological and counseling clinics in Isfahan were selected. From the population of all clients in the two clinics who were diagnosed as ADHD by the psychiatrists, 30 were selected randomly and assigned into the experimental and control groups (15 subjects each). At the pre- and post - test stages, before and after 8 sessions which took 30-45 minutes every two days with play
therapy and emphasis on increasing attention and decreasing hyperactivity, CSI-4 and MFFT questionnaires were applied to both groups. Furthermore, in order to diagnose any change after the play therapy a follow-up study was conducted after a month. The data were analyzed by SPSS14. Finding of this research has showed that the play therapy decreased the amount of ADHD hyperactivity, attention deficit, and response errors symptoms significantly, but increased response time significantly. So the significant differences between the experimental and control groups as well as the follow-up it was evident that play therapy may be applied as an effective method of treatment for children and adolescence with ADHD preferably, a combination of this and other relevant methods may be used for the treatment of those with ADHD. As the ADHD symptoms were decreased significantly after the intervention, the positive effect of play therapy was confirmed.

David Vernon & Ann Frick and John Gruzelier (2002) have done a research Neurofeedback as a treatment for ADHD: A methodological review with implications for future research.

Result of this research highlight that Attention deficit/hyperactivity disorder (ADHD) represents one of the most common psychiatric disorders in childhood, resulting in serious impairment across a variety of domains. Research showing that a high proportion of children with ADHD exhibit a dysfunctional electroencephalogram (EEG), relative to aged matched peers, provides a rationale for the use of neurofeedback as an intervention. The aim of neurofeedback training is to redress any EEG abnormality, resulting in a
concomitant improvement in the behavior and/or cognitive performance of these children. This review focused on studies using neurofeedback to treat children with ADHD, with particular emphasis on the methodological aspects of neurofeedback training. Specifically, the review examined the modality of feedback provided, the different training parameters and their underlying rationale, and the particular montages used. In addition, the review also focused on the duration, frequency and total number of training sessions required to obtain a positive effect in terms of a change in the individual's EEG, behavior and/or cognitive performance. Finally, the long-term effects of neurofeedback and the potential negative side effects were reviewed. Throughout, the review provides a number of directions for future research.

Behavioral models of impulsivity in relation to ADHD: Translation between clinical and preclinical studies has been done by Catharine A. Winstanley, Dawn M. Eagle (2006) in Department of Experimental Psychology, University of Cambridge, has shown that Impulsivity, broadly defined as action without foresight, is a component of numerous psychiatric illnesses including attention deficit/hyperactivity disorder (ADHD), mania and substance abuse. In order to investigate the mechanisms underpinning impulsive behavior, the nature of impulsivity itself needs to be defined in operational terms that can be used as the basis for empirical investigation. Due to the range of behaviors that the term impulsivity describes, it has been suggested that impulsivity is not a unitary construct, but encompasses a variety of related phenomena that may differ in their biological basis. Through
fractionating impulsivity into these component parts, it has proved possible to devise different behavioral paradigms to measure various aspects of impulsivity in both humans and laboratory animals. This review describes and evaluates some of the current behavioral models of impulsivity developed for use with rodents based on human neuropsychological tests, focusing on the five-choice serial reaction time task, the stop-signal reaction time task and delay-discounting paradigms. Furthermore, the contributions made by preclinical studies using such methodology to improve our understanding of the neural and neurochemical basis of impulsivity and ADHD are discussed, with particular reference to the involvement of both the serotonergic and dopaminergic systems, and frontostriatal circuitry.

A study on Behavior therapy and methylphenidate in the treatment of children with ADHD done by Klein ,R.G and Abikoff, H(2009 ). Parents and teachers viewed children on behavior therapy as improved, but objective observations did not document behavioral change. In contrast, methylphenidate and the combined treatment induced significant improvement in all measures of outcome. Methylphenidate and the combination treatments were significantly superior to behavior therapy, in a few instances. The combination, which normalized behavior, was superior to methylphenidate. However children switched to placebo deteriorated significantly. Behavior therapy delivered in school and home is not nearly as effective as methylphenidate for ADHD, but may be a useful adjunct to methylphenidate. Also in another research with the title “Cognitive training in ADHD children: less to it than meets the eye” reviews the result of cognitive training studies that have
been carried out with children with attention deficit-hyperactivity disorder (ADHD) during the past decade. The efficacy of cognitive training as a single intervention and as an adjunct to stimulant treatment is discussed. The impact of training on the cognitive, academic, and behavioral functioning of youngsters with ADHD is summarized. Although this treatment modality is inherently appealing, there is little empirical support for its clinical utility with children with hyperactivity.

Efficacy of Cognitive – Behavior therapy in the treatment of children with ADHD with and without aggression was studied by Anna Miranda and Maria Jesus Presentation (2000) at the University of Valencia (Spain) and University of Castellon (Spain).

The objectives of the study were twofold: to show the efficacy of a cognitive-behavioral self-control therapy on children with ADHD and to determine whether the combination of training in self-control with training in anger management has better outcomes on two subgroups of hyperactive children, aggressive and nonaggressive. Thirty-two children with ADHD, 16 aggressive and 16 nonaggressive, participated in the research. They applied a cognitive-behavioral self-control training, which included self-instructional training via modeling and behavioral contingencies, to 16 of the 32 hyperactive children. The other 16 hyperactive children were taught the same program, but combined with anger management training. The interventions were carried out by two therapists each taking care of four groups, one of each in the following conditions: hyperactive with the cognitive-behavioral self-control therapy, hyperactive with the combined treatment, hyperactive-aggressive with the cognitive-behavioral self-control therapy, and hyperactive-aggressive with the combined treatment. The results indicated important improvements on several measures in all treated groups. Furthermore the improvements of children with aggressiveness were
slightly better, according to the parents, with the combined treatment than without it. The data provide support for including anger management training in the cognitive-behavioral interventions for hyperactive-aggressive students.

An overview of the available literature indicates that prevalence rate of ADHD in various part of the world greatly vary with prevalence rates from 3% to 23%. Many studies have show the disorder to be more prevalence in males than females, with first born more likely to be affected by the disorder.

Although most researches highlight different etiological feature most have found that a combined treatment of medication and therapy to be more effective.