CHAPTER II

REVIEW OF RELATED LITERATURE

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REVIEW OF RELATED LITERATURE

The review of the literature, which has been done in preparation for this study, focused on the research studies conducted in the area of prevalence and correlation of ADHD with regard to adolescent stage, gender and intelligence. The following sections of this chapter will present the review of relevant literature in these areas.

2.1 ANALYSIS OF STUDIES REGARDING PREVALENCE OF ADHD

The prevalence of ADHD in different parts of the world has been reported in many studies and reports. The worldwide prevalence of ADHD varies from less than 1% to over 20%, although a reasonable estimate of prevalence in the U.S. is 4-6% (Climb Up). The prevalence of ADHD is also conservatively estimated as being from 3% to 7% of the school-age children in the United States (APA, 2000). Barkley (1998) suggested that prevalence data are affected by the instruments used to determine the disorder and the diagnostic criteria used. The younger the child is, the more likely it is that he or she will be diagnosed as having the hyperactive/impulsive ADHD versus the inattentive or combined types (Barkley, 1998).

Although there is general agreement that ADHD is a worldwide phenomenon (Barkley, 1998), it has been difficult to obtain and compare prevalence data as the perception and severity of such behaviours vary greatly from culture to culture (Gingerich, Turnock, Litfin & Rosen, 1998). Prevalence rates in countries other than U.S. have been reported to be between 3% and 9.5%, roughly analogous to U.S. data (Gingerich et al., 1998). Gingerich et al. (1998) and Barkley (1998), among others,
have also reported increased incidence of ADHD in the lower socio-economic class, a finding that is perhaps due to social drift (Barkley, 1998) which means that children with ADHD are less likely to benefit from their education and adapt less well in various situations. As a result, as adults they are underemployed, with the commensurate lower income, causing them to drift toward the lower socio-economic class (Root & Resnick, 2003).

In India, there is very little systematic research in ADHD among children (Singhi & Malhi, 1998). The few studies report prevalence rates ranging from 10 to 20% (Bhatia, Choudhary & Sidana, 1999; Bhatia, Nigam, Bohra & Malik, 1991). In the study by Bhatia et al. (1991) involving screening referrals to a paediatric clinic in Delhi, out of 1,000 children (aged 3-12 years), 112 were found to have attention deficit disorder with hyperactivity (ADDH). The prevalence of ADDH increased with age from 5.2% in those aged 3-4 years, up to 29.2% in those aged 11-12 years. Prevalence estimates based on a behavioural definition which assesses symptoms shown at a single point of time is found in 10-20% of general population in India (Bhatia et al., 1991). In the study conducted by Malhi and Singhi (2000), the prevalence of ADHD among children aged 3-12 years attending psychology outpatient services in the department of Paediatrics of a tertiary care hospital in India was found to be 8.1%.

A clinical profile carried out in Chandigarh by Kaur and Chavan et al. in 2004 of children attending the Early Intervention Program, showed Attention Deficit Hyperactivity Disorder (ADHD) to be present in 12% of the 100 children examined. In another study done in Kolkata by Mukhopadhyay et al. (2003), the prevalence of ADHD among the
children of age group 5-12 years, involving a child guidance clinic of a paediatric hospital, was found to be 15.5%.

2.2 ANALYSIS OF ADHD STUDIES AMONG ADOLESCENTS

Prior to the 1970s, ADHD symptoms were thought to abate and disappear during adolescence stage of development (Volk-Stowell, 2004). It was believed that these symptoms subside with the onset of puberty, but ongoing research has shown that 30% to 70% of persons with ADHD will carry symptoms into adolescence (Weiss & Hechtman, 1993). In fact, Weiss and Hechtman (1993) reviewed a number of studies and concluded that symptoms of the original syndrome do subside in a number of adolescents as primary problems; however, difficulties with discipline, anti-social behaviour, poor school performance and poor peer relationships increase.

According to Barkley (1998), between 30% and 80% of children with ADHD continue to show symptoms in adolescence. He also reported that ADHD declines with age, however, 70-80% of hyperactive children continue to manifest symptoms into adolescence. A portion of these adolescents will meet full criteria for ADHD (65-80% will have full criteria in early adolescence, 30-50% into late adolescence) (as cited in Bever, 2005).

Fischer, Barkley, Edelbrock & Smallish’s (1990) study followed children for an 8 year period that extended from elementary school age to adolescence. The children were evaluated for attention, academic skills and impulse control. The study indicated that children with hyperactivity symptoms continued to have difficulty in academic achievement, inattention and more behavioural problems at home and school. This
study supports the concern that the cardinal signs of ADHD inattention, hyperactivity and impulsivity do not terminate during adolescence.

Bitar (2004) reported that the symptom of motor hyperactivity diminishes with age, but symptoms of impulsivity and inattention persist through adolescence. Although physical hyperactivity may diminish with age, signs of hyperactivity may manifest internally in adolescence, often in the form of restlessness. Adolescents may feel confined if they are in a classroom for long periods or have to sit at a desk for long periods (Robin, 1998). Bitar (2004) also elaborated that the impulsivity, a characteristic of many adolescents, is magnified in the adolescent with ADHD. The teens with ADHD have difficulty in postponing wants and desires. They act on a whim and have difficulty in dealing with rules. In school, they rush through their work, making careless mistakes. Emotionally they can be moody and can have aggressive outbursts of temper that can be directed at others or themselves in the form of deliberate self-harm. Deficient impulse control can lead to serious life difficulties because of poor decision making with regard to sexuality, substance use, driving and other high-risk behaviours (Robin, 1998).

Children with either the predominately hyperactive/impulsive or combined sub-type of ADHD often, as they mature, change in their presentation and meet the diagnostic criteria for the predominantly inattentive type of ADHD, as hyperactive and impulsive symptomatology is reduced or brought under better control (Goldstein & Goldstein, 1998). Many support this progression of the disorder, wherein children who are originally diagnosed with the hyperactive/impulsive type are found to display more of the inattentive symptomatology as they become older adolescents and adults (Resnick, 2000).
2.3 ANALYSIS OF ADHD STUDIES IN RELATION TO GENDER

Several studies have documented greater incidence of ADHD among boys than in girls both in the western countries (Wolraich et al., 1996) and in India (Bhatia et al., 1991). Although boys with ADHD outnumber girls, estimates of the ratio of boys to girls vary significantly (Root & Resnick, 2003). Ranges of 2:1 to 9:1 have been reported, with the gender difference less obvious for the inattentive type of ADHD (APA, 2000). According to Tannock (1998), ADHD is over represented in boys by approximately 3:1 and has been reported as high as 10:1 in clinical samples (Biederman, 1998). In epidemiological samples, however, the preponderance of boys over girls is much less, with ratio of approximately 2:1 (Biederman, 1998). Barkley (1998) reported ratio of boys to girls closer to 1:1 in community-based samples; however, in clinic-based samples, it is about 6:1 because of the disruptive and noncompliant aspects of their behaviour (Barkley, 1998).

In India, Chadha (2003) conducted a study on primary school children in Delhi and found that ADHD prevalence was significantly higher among boys than among girls. In the study conducted by Malhi and Singhi (2000) on children aged 3-12 years attending psychology outpatient services in the Department of Paediatrics of a tertiary care hospital in India, the male-female ratio of children with ADHD was found to be 5:1.

According to Biederman, Faraone, Mick and Williamson (1999), girls with ADHD demonstrate the same core symptoms and high levels of comorbid disorders as do boys. However, boys are more likely to be aggressive and to have other behavioural problems (Gaub & Carlson, 1997b). Girls can be overly talkative and overly social (Nadeau, Littman & Quinn, 2000). In a study of 1550 twins and siblings of children with ADHD, Levy, Hay, Bennett & McStephen (2005) found more
externalizing symptoms in males and more internalizing symptoms in females.

The prevalence of the ADHD sub-types too has been found to differ between genders. In the study by Wolraich et al. (1996), females accounted for 32% of inattentive children, 19% of hyperactive children and 22% of the combined sub-type. In a study of 3,000 children including pre-schoolers, elementary as well secondary school children, females tended to be diagnosed more often than males with the inattentive sub-type; and except for preschool age, the hyperactive sub-type was the least diagnosed sub-type among girls (Nolan et al.). In fact, majority of studies performed in 2002 and before showed a greater prevalence of ADHD-IT (predominantly Inattentive Type) than ADHD-CT (Combined Type) in girls (Biederman, Faraone & Monuteaux, 2002). However, some recent studies show that girls are more likely to have ADHD-CT, rather than the previously thought ADHD-IT (Payne, 2008). Biederman et al. (2005) found more ADHD-CT in non-referred female subjects with ADHD. Graetz, Sawyer & Baghurst (2005) found more ADHD-CT in Australian females diagnosed with ADHD. Zalecki & Hinshaw (2004) in a multi-method investigation also found that the ADHD-CT sub-type was more common in girls. However, Novik et al. (2006) found that ADHD-CT was more prevalent in both girls and boys in the longitudinal, multi-center study in Europe. Yang, Jong, Chung & Chen (2004) found that males and females were indistinguishable in symptoms of referred ADHD-CT children.

It is possible that the diagnosis is being missed in girls and they are going untreated for this disorder that has significant morbidity (Payne, 2008). Children are usually diagnosed following complaints from parents or teachers about difficulty in adjusting to the school environment. If
children do not cause problems in the classroom, teachers and parents may be less likely to request an evaluation for ADHD. Therefore, parent and teacher bias contribute to problems diagnosing ADHD in girls (Staller & Faraone, 2006).

2.4 ANALYSIS OF ADHD STUDIES IN RELATION TO INTELLIGENCE

Intelligence has been defined by psychologists as “the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with his environment” (Wechsler, 1958) and also as the “combination of traits required and reinforced by the cultural environments in which individuals function throughout their life span” (Anastasi, 1986). For the better part of the last century, conventional notions of intelligence have typically referred to as innate cognitive abilities that are applied in academic, professional and everyday settings (Sidel, 2007).

The relationship between ADHD and intelligence is the source of some controversy in the scientific literature (Sidel, 2007). The majority of studies have found that children with ADHD generally have lower overall I.Q. scores as compared to normal controls (Assesmany, McIntosh, Phelps & Rizza, 2001; Barkley, DuPaul & McMurray, 1990; Faraone et al., 1993; Frazier, Demaree & Youngstrom, 2004; Loge, Staton & Beatty, 1990; Tripp, Ryan & Peace, 2002), although a few studies have found no difference (Kaplan, Crawford, Dewey & Fisher, 2000; Mahone et al., 2002). Hinshaw, Morrison, Carte and Cornsweet (1987) found that the school-aged children with ADHD have deficient general cognitive ability, as measured by I.Q. testing, in comparison to normally developing children. Barkley (1997, 2004) is one of the prominent researchers to suggest that the wide-ranging list of cognitive
deficits observed in ADHD can be explained by an underlying executive function deficit.

Academic underachievement generally accompanies this disorder with deficiencies noted in a wide-range of school subjects including math, reading, spelling and writing skills (Schuster, 2005). Children with ADHD often demonstrate problems with concentration that may then lead to poor performance on arithmetic measures, digit span, auditory comprehension and problem solving tasks (Schuster, 2005). These tests are thought to involve a working memory component (Barkley, 2004; Kyllonen & Christal, 1990).

However, it is not unusual for a child with ADHD to have adequate academic achievement scores and yet perform below expectations within the classroom. One explanation for this apparent underachievement is that performance deficits are responsible for the discrepancy, rather than an actual lack of knowledge (Schuster, 2005). Barkley (2003) has identified this pattern of performance as one of knowing what to do, but not knowing when to do it.

Many of the studies, both among those that detected a difference in I.Q. relative to controls and those that did not detect a difference, have found that the I.Q.s of children with ADHD are within the average range, i.e., 90-109 on a Wechsler scale (Loge et al., 1990; Naglieri, Goldstein, Delauder & Schwebach, 2005). Barkley (1998) has concluded that the intellectual abilities of children with ADHD represent the full spectrum, from mental retardation to giftedness. Yet the prevailing belief of lower I.Q. scores among children with ADHD in the literature raises the question as to whether intellectual impairment is a feature of ADHD or if the lower I.Q. scores are an artefact of other cognitive difficulties that these children experience (Sidel, 2007). One possibility is the presence
of learning disabilities. Comorbid learning disabilities are thought to occur in approximately 25% of children with ADHD (Barkley, 2002; Shelton & Barkley, 1995). Although many children with ADHD have comorbid learning disabilities (Decker, McIntosh, Kelly, Nicholls & Dean, 2001; Semrud-Clikeman et al., 1992), yet studies have been able to rule out this factor as the cause of depressed I.Q. scores (Kaplan et al., 2000).

Research findings are mixed regarding intellectual differences among the ADHD sub-types (Milich et al., 2001). Most studies show no significant differences in intelligence among Sub-types (Barkley et al., 1990; Faraone et al., 1998; Goodyear & Hynd, 1992; Maedgen & Carlson, 2000; Milich et al., 2001; Morgan et al., 1996; Stanford & Hynd, 1994). However, the inattentive sub-type has presented lower scores on tests of intelligence than the other sub-types (Barkley et al., 1990; Halperin, 1991; Marshall et al., 1997; Marshall et al., 1999; McBurnett et al., 1999; Willcutt et al., 1999). The hyperactive sub-type has shown significantly higher mean sub-test scaled scores on Block Design than the inattentive sub-type; (Garcia-Sanchez et al., 1997); the same pattern has also been seen for Coding and Arithmetic (Barkley, Fischer, Edelbrook, Craig & Smallish, 1990). Several studies have also suggested that the inattentive Sub-type can be differentiated from the other Sub-types based on the presence of a sluggish cognitive tempo, which is comprised of behaviours such as drowsiness, hypoactivity and lethargy. Examination of sluggish cognitive tempo suggested that there may even be two inattentive Sub-types (Milich et al., 2001). Some studies suggest that the females with ADHD scored lower in I.Qs. than males with ADHD (Biederman et al., 1999; Seidman et al. 1997).
Controversy still exists as to whether intelligence is a variable that should be controlled in ADHD studies, or if doing so would artificially reduce the amount of impairment demonstrated by children with ADHD (Lahey et al., 2004). While some researchers continue to control for intelligence when examining other abilities of children with ADHD, others are reluctant to do so (Sidel, 2007). In fact, those, who judge lower intellectual ability to be an inherent feature of the disorder, consider such statistical methods to be erroneously flawed (Frazier et al., 2004).

2.5 CONCLUSION

A review of the related literature suggests the ADHD to be a worldwide phenomenon with varied prevalence rate. The disorder continues to manifest itself in adolescent stage and may result into behavioural and academic impairments although its symptomology in terms of various sub-types of ADHD may change, displaying more of inattention symptoms than hyperactive/impulsive type with age. The majority of the studies reported more prevalence in boys than in girls but as reported by some studies, the two genders may differ in the manifestation of various sub-types of the disorder; an area which requires further investigation to know more about the correlation of various ADHD sub-types with gender. As regarding relationship of ADHD with intelligence, many studies report more ADHD prevalence in low I.Q. school aged children which can result into academic underachievement in areas like math, reading, writing, problem solving etc. There are studies which report no correlation between the disorder and the intelligence; some even equate the intellectual capabilities of ADHD subjects with giftedness. The mixed results of studies regarding the intellectual differences among ADHD sub-types also suggest the need to investigate the matter further.
The report of females with ADHD scoring less in I.Q. tests in some of the studies brings in the need to introduce the interactional element in the research design.

Keeping all these things in mind, the study was planned to cover the stated controversial and unexplored issues and thus various null hypotheses were formulated to know about the correlation of gender, intelligence and their interactional influence with various sub-types of ADHD. The sparse research in the area of adolescent ADHD scenario in India further ratifies the need of research in this field.