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Literature Review : Teachers' Knowledge and Attitudes About Attention-Deficit Hyperactivity Disorder (ADHD)

Bruna Bekle
Edith Cowan University

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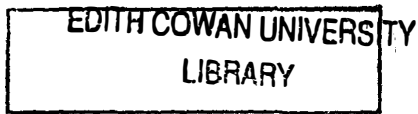
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Literature Review: Teachers' Knowledge and Attitudes About
Attention-Deficit Hyperactivity Disorder (ADHD)

Bruna Bekle

A Report Submitted in Partial Fulfilment of the Requirements for the
Award of Bachelor of Science (Psychology) Honours, Faculty of
Community Services, Education and Social Sciences, Edith Cowan
University.

November, 2000

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Abstract

Literature Review: Teachers' Knowledge and Attitudes About Attention-Deficit Hyperactivity Disorder (ADHD)

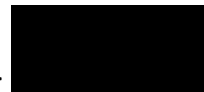
ADHD is a neuro-developmental disorder that is diagnosed in 3 to 6% of the childhood population in a diversity of cultures and a variety of geographical locations. It presents as a persistent pattern of inattention and/or hyperactivity-impulsivity, with boys being over-represented by approximately 3 to 1. High levels of comorbidity between ADHD and a number of other disorders, including Oppositional Defiant Disorder, Conduct Disorder, and learning disabilities, have been identified. This review will examine the historical development of the understanding of ADHD, knowledge of its etiology, and the influence of this disorder in the school environment. In particular, it will explore the relatively few studies available on teachers' knowledge of, and attitudes to, the treatment of ADHD. Current research will also be analysed to determine the way in which teachers' knowledge about ADHD is inter-related with their general attitude toward the condition. As teachers have a major influence on the success or failure of ADHD students, it is important for them to have positive attitudes and a sound knowledge base regarding the disorder. The literature will be used to provide evidence of the difficulties that ADHD children experience in the behavioural components needed for academic success, and the role that teachers might play in the process of identification, assessment, and management of this disorder. Finally, this review will examine the implications of these findings for the provision of ADHD training to teachers.

Author: Bruna Bekle
Supervisors: Dr Lisbeth T. Pike (Principal)
Dr Phyllis Prout (Associate)
Submitted: November, 2000

Declaration

I certify that this thesis does not incorporate, without acknowledgement, any material previously submitted for a degree or diploma in any institution of higher education and that, to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where due reference is made in the text.

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November, 2000

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I wish to mention in particular the contributions of Mr Alan Dodson (Education Department of Western Australia), Mr John Clark (Mt Lawley Primary School), Mr Barry France (Creaney Primary School), Mr Anthony Needham (West Balcatta Primary School), Ms Lyn Parker (Coolbinia Primary School), Ms Paola Vallesi (North Perth Primary School), Mr Michael Carmody (Mt Hawthorn Primary School), Ms Janina Trotman (Edith Cowan University). Special thanks are also extended to all of the participants who completed the questionnaire.

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I am especially indebted to my husband Hugo, and to my family, for their continued encouragement, patience and support throughout this project.

Honours Thesis Format

This thesis conforms to “Option 2: The Research Paper and Review” in the School of Psychology Honours Handbook, 2000. This format includes two separate documents: a Literature Review and a Research Report. Both of these documents conform to APA guidelines, and are intended to be publishable in their own right.

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Introduction

Overview

Attention-Deficit Hyperactivity Disorder (ADHD) is one of the most commonly diagnosed and heavily researched childhood disorders (Cantwell, 1996; Conners, 2000; Gaub & Carlson, 1997). It occurs in approximately 3 to 6% of the childhood population in a diversity of cultures and a variety of geographical locations (Tannock, 1998), with boys being over-represented by approximately 3 to 1 (Barkley, 1997). However, little information is available on the effect of ADHD in the school setting (Reid, Vasa, Maag, & Wright, 1994), and even less is known about teachers' knowledge of, and attitudes to, the treatment of ADHD (Jerome, Washington, Laine, & Segal, 1999).

Some authors have argued that teachers are poorly informed about ADHD, or misunderstand the nature, course, causes, outcomes and suitable interventions for ADHD (Pfiffner & Barkley, 1990; Shapiro & DuPaul, 1993). However, such generalised statements are not derived from research-based studies that explore the knowledge and attitudes of educators about ADHD.

The small number of studies of ADHD in the school setting have focused upon the effectiveness of teacher observations for the identification of ADHD (Atkins, Pelham, & Licht, 1989; DuPaul & Stoner, 1994), or upon teachers' perceptions regarding medication and treatment (Amirkhan, 1982; Brophy & McCaslin, 1992). Only a few studies have examined teachers' beliefs and knowledge relating to general issues of identification, diagnostic criteria, and treatment of students with ADHD (Germaeyne, 1994; Hawkins, Martin, Blanchard,

& Brady, 1991; Jerome, Gordon, & Hustler, 1994; Jerome et al., 1999). Findings from these studies suggest teachers need to be increasingly knowledgeable about assessment procedures, as well as instructional, behavioural, and social skill strategies that are appropriate for working with children who have ADHD. Teachers also need to be able to communicate with physicians and outside professionals who are involved in the treatment of these students (Jerome et al., 1994).

Early and accurate identification of ADHD in children is necessary to provide for their specific educational needs (Fell & Pierce, 1995; Montague, McKinney, & Hocutt, 1994). To this end, teachers' expert observational skills and familiarity with age appropriate norms for behaviour can assist parents and medical specialists in the process of diagnosis (including identification and assessment) and treatment of ADHD.

Teachers also have the opportunity to experience childrens' response to medication in the classroom, but in many cases, clinicians are not making use of teachers' rating scales for diagnosis and determination of response to treatment. Instead, medical evaluations are often based on subjective parental reports (Gadow, 1986). Even when teachers' rating scales are used, Jerome et al. (1994) cautioned that response bias to the questionnaire can lead to significant variation in behavioural observations between teachers, as well as with individual teachers over time. Consequently, these authors recommended obtaining information on individual teachers' knowledge and attitudes regarding ADHD.

Teachers' knowledge about ADHD is also inter-related with their general attitude towards the condition. For example, some teachers hold a negative view of

working with children that display disruptive behaviour disorders, such as ADHD (Algozzine, 1980; Coleman & Gilliam, 1983). To this end, research suggests that such a negative view might be improved by exposing those teachers to up-to-date information, which explains the nature of the condition and the likely response of affected students to appropriate treatment (Li, 1985).

As a first step in preparing teachers to better serve those students who have ADHD, it is necessary to determine what teachers believe and know about this disorder (Jerome et al., 1994). Such information can assist those responsible for delivering in-service training to practising teachers. It is even more important that this information is made available for the training of students studying education, in order to provide them with more appropriate professional preparation to address the needs of ADHD students in their classrooms (Jerome et al., 1999).

Defining the term ADHD

ADHD is a neuro-biological developmental disorder that is one of the most frequently diagnosed disorders among school-age children (Barkley, 1997). This developmental disorder can be broadly defined as follows:

A persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequent and severe than is typically observed in individuals at a comparable level of development. Symptoms of the impairment must have been present in at least two settings. Additionally, there must be developmentally inappropriate social, academic, or occupational functioning (Grynkewich, 1996, p. 20).

Another definition by Barkley (1990) similarly describes the nature of this disorder, but also emphasises how ADHD is distinguishable from other psychiatric, developmental, and neurological disorders. It states that ADHD is a developmental disorder characterised by:

Developmentally inappropriate degrees of inattention, overactivity, and impulsivity. These often arise in early childhood; are relatively chronic in nature; and are not readily accounted for on the basis of gross neurological, sensory, language, or motor impairment, mental retardation, or severe emotional disturbance. These difficulties are typically associated with deficits in rule-governed behavior and in maintaining a consistent pattern of work performance over time. (p.87)

The diagnosis of ADHD is a clinical diagnosis. It is made on the basis of a clinical picture that begins early in life, is persistent over time, is pervasive across different settings, and causes functional impairment at home, at school, or in leisure time activity (Cantwell, 1996). To accord with definition, a child should exhibit at least some of the diagnostic symptoms of ADHD before the age of seven years (American Psychiatric Association, 1994; Dunne et al., 1997), in which case a diagnosis is inclined to be confirmed by age nine (Grynkewich, 1996).

To this end, a more detailed psychiatric explanation and list of current diagnostic criteria for ADHD can be obtained from the Diagnostic and Statistical Manual of Mental Disorders, fourth edition, (DSM-IV) of the American Psychiatric Association (1994). The DSM-IV is considered the definitive source for clinical, research, and educational purposes as it is supported by an extensive empirical

foundation. A list of the criteria for ADHD, defined in the DSM-IV, is presented in Appendix A. The core symptoms identified by DSM-IV are inattention and hyperactivity/impulsivity (as an alternative to the DSM-IV, Carragher (1999) noted that some clinicians utilise criteria from the International Classification of Diseases-10 (ICD-10) Classification of Mental and Behavioural Disorders).

The commonly held misconception that ADHD was magically “outgrown” by children in adolescence has now been dispelled. It is estimated that 50%-80% of individuals diagnosed with ADHD as children continue to experience ADHD symptoms to a significant degree in adolescence (Barkley, 1990). Impairment in adolescents results in diminished school performance, low self-esteem, poor peer relations, and erratic work record (Dunne et al., 1997). Persistent symptoms were found in Pineda’s study (as cited in Pineda et al., 1999) to lead to an increased risk for the development of antisocial behaviours, substance abuse, and psychopathology.

In a review of the historical development of ADHD research, Connors (2000) concluded that more use needs to be made of normative and developmental information. Even though core symptoms of ADHD may change over time, the same criteria are presently applied across the entire age span. Such an approach ignores evidence that there are significant developmental changes for inattention and hyperactivity symptoms. How these symptoms evolve and change in relation to one another is an important unsolved problem.

Because of the nature of the disorder and the problems that ensue, ADHD is regarded by teachers, parents and the community as both perplexing and frustrating.

The teacher with an ADHD student in their classroom is faced with a heterogeneous set of problems (Forlin, 1995). ADHD can therefore be regarded as one of the most significant disorders confronting child and adolescent psychiatrists, parents and teachers (Cantwell, 1996; Carragher, 1999; Dunne et al., 1997).

Prevalence of ADHD

Large-scale population studies of school-aged children indicate that prevalence rates of ADHD are likely to be in the order of 3 to 5% (Barkley, 1990; Cantwell, 1996). These studies also suggest that boys are more likely to exhibit the disorder than girls at levels of approximately 3 to 1 (Barkley, 1997). Other widely quoted estimates include 9 to 1 in clinical samples, and 4 to 1 in epidemiological samples (American Psychiatric Association, 1994; Barkley, 1990). However, such estimates may be highly conservative in light of recent subtype and gender-comparison research (Wolraich, Hannah, Pinnock, Baumgaertel, & Brown, 1996).

With regard to prevalence, researchers have speculated that with the newly identified ADHD subtypes (Predominately Hyperactive-Impulsive, Predominantly Inattentive, and Combined) the percentage of individuals affected by this disorder may be higher than previously reported (Wolraich et al., 1996). Gender-comparison research by Brown, Madan-Swain, & Baldwin (as cited in Zametkin, 1995) has also highlighted deficiencies in the identification of ADHD. This research revealed that male to female ratio figures of ADHD may not be entirely representative due to the under-identification of females in the school-aged population. An explanation for the under-identification of females with ADHD was provided by Wolraich et al.

(1996). While females may have primarily inattentive and cognitive problems, they usually demonstrate less hyperactivity, and impulsivity than their male counterparts.

Irrespective of gender, it is estimated that as many as 50% of children with ADHD are never diagnosed (Amaya-Jackson, Mesco, McGough, & Cantwell, 1992; Elia, Stoff, & Coccaro, 1992).

Comorbidity of ADHD

High levels of comorbidity between ADHD and a number of other disorders, including Conduct Disorder (CD), have been identified (Milberger, Biederman, Faraone, Murphy, & Tsuang, 1995; Biederman, Newcorn, & Sprich, 1991). Moreover, a systematic literature review by Tannock (1998) revealed that the most frequently observed comorbidity is between ADHD and other disruptive behaviour disorders, with Oppositional Defiant Disorder (ODD) and CD occurring in approximately 40% to 90% of cases. Cantwell (as cited in Cantwell, 1996) also observed that adolescents with ADHD tended to comorbidity with other significant disorders, such as language and communication disorders, learning disorders, anxiety disorders, mood disorders, and Tourette's Syndrome (or chronic tics). For example, 15 to 20% of children with ADHD have concurrent mood disorders, approximately 25% have comorbid anxiety disorders, and about 20% have specific learning disabilities (Biederman et al., 1991; Tannock, 1998).

According to Epstein, Shaywitz, Shaywitz, and Woolston (1991), there is a need to disassociate and differentiate ADHD as a disorder distinct from other disorders such as ODD and CD. Comorbidity complicates the diagnostic process, and can have an impact on natural history, prognosis, and the management of

children with ADHD (Cantwell, 1996). Furthermore Epstein et al. (1991) supported the view that while the high level of comorbidity within ADHD could create difficulties for diagnosticians, it does not invalidate the diagnosis of the disorder itself.

Assessment and treatment of the comorbid disorder is often equally as important as addressing the ADHD symptomatology. It may be that some of the comorbid conditions, such as ADHD plus Tourette's syndrome or ADHD plus CD, may lead to specific subgroups of ADHD characterised by differences in natural histories, underlying etiological factors, and responses to treatment (Cantwell, 1996). What is important is the need to gain a better understanding of ADHD comorbidity patterns in order to guide treatment, research and future classification approaches. Furthermore, comorbidity should be given greater consideration in the design of future studies of ADHD in children and adolescents, particularly if the presence of comorbid disorders (or symptoms) affects the short and long-term response to treatment (Jensen, Martin, & Cantwell, 1997).

Historical Development of the Understanding of ADHD

Early Background to ADHD

Children now referred to as having ADHD have previously had many labels attached to their behavioural symptoms. The early history of ADHD has been thoroughly documented by several authors (Barkley, 1990; Ross & Ross, 1982), including a chronology of historical landmarks in the evolution of the concept of ADHD (Conners, 2000). The British pediatrician, Sir George Still, is generally credited in the medical literature with having provided the first clinical description

of ADHD. He introduced the notion of an impulsive syndrome in children (mostly boys), who are not simply brain injured or retarded. Instead, the syndrome was probably the result of genetic or environmental factors (Conners, 2000).

When the world-wide epidemic of Von Economo's Encephalitis (inflammation of the brain) occurred in 1917 and 1918, many survivors were left with problems of inattention, impulsivity, and hyperactivity. These symptoms were similar to those described by George Still. Consequently, these deficits were thought to be neurological problems, since they were seen as the result of brain injury among epidemic survivors (Conners, 2000). When the same set of deficits was noted among children without known brain injury, it was assumed that some unidentified brain injury must be present, but that it must be hard to detect or "minimal" (Barkley, 1990). As a result, hyperactive or inattentive children were often referred to as having "minimal brain damage" (Barkley, 1990). Laufer and Bradley's observations (as cited in Conners, 2000) seemed to be more consistent with a "functional disturbance" of the brain rather than "damage". As a consequence, the term "minimal cerebral dysfunction" was adopted in place of minimal brain damage. A further advancement in the understanding of ADHD was provided by Douglas and Peters' studies of cognitive functioning in hyperactive children (as cited in Conners, 2000), which suggested that attentional deficits are the key elements of the hyperactive child syndrome. This work placed emphasis on cognitive rather than motor deficits.

Since its inception, ADHD has been known by many other names, such as Hyperkinesis, Hyperactivity, and Attention Deficit Disorder with Hyperactivity or

without Hyperactivity (Gaub & Carlson, 1997). This changing categorisation reflects previous disagreement regarding diagnostic inclusion of the three core characteristics: impulsivity, inattention, and hyperactivity (Cantwell, 1996; Conners, 2000). Various editions of the DSM have implemented different subtyping systems that cluster the three core characteristics in a number of ways. However, there has been general agreement that the core systems consist of an inattention domain and a hyperactivity/impulsivity domain (Gaub & Carlson, 1997).

With the American Psychiatric Association's (1968) publication of DSM-II, hyperactivity was singled out as the predominant element of what was called "Hyperkinetic Reaction of Childhood" (Gaub & Carlson, 1997). DSM-III (1980) subtyped ADHD children using a unidimensional approach such that a child was diagnosed as Attention Deficit Disorder (ADD) with hyperactivity or ADD without hyperactivity, thus making attention the defining concept (Gaub & Carlson). Three key symptom groups of hyperactivity, impulsivity, and inattention were provided along with specific symptoms for each category (Conners, 2000). The revised DSM-III-R (1987) specified varying degrees of hyperactivity (Gaub & Carlson). The most recent manual, DSM-IV, has returned to a bidimensional system, clustering hyperactivity and impulsivity symptoms into one dimension, and separating it from the inattention dimension (American Psychiatric Association, 1994). DSM-IV presents an ADHD diagnosis with three subtypes: Predominantly Inattentive, Predominantly Hyperactive/Impulsive, and Combined. Jensen et al. (1997) argued for two further sub-classifications of ADHD: Aggressive Subtype, and Anxious Subtype.

Much attention has been given to the increasing use of stimulant medication with school age children with ADHD. Barkley (1992) attributed such a trend to the growing interest in research on the effects of medication (e.g., showing a marked decrease in hyperactivity). Despite the promising, and often dramatic, results achieved with stimulant medication, public and professional concern emerged in the early 1970s regarding its widespread use with children (Cantwell, 1996). At the same time, alternative views emerged about the nature and cause of ADHD. One particular claim was that hyperactivity is a myth created by intolerant teachers and parents, and fostered by an inadequate educational system (Barkley, 1990). Almost simultaneously, another belief emerged that hyperactivity was due to other environmental causes, such as, diet (Feingold, 1975), and an increase in stimulation caused by the demands of a transient and fast-paced society (Block, 1977). Alternatively, Ross and Ross (1982) proposed that societal views determine the threshold for tolerance of deviant behaviour, and in setting such standards for child behaviour, hyperactivity may be exaggerated in some children.

Knowledge of the Etiology of ADHD

Many explanations for the cause of ADHD have been proposed: resistance to thyroid hormone, presence of a difficult family environment, being born to mothers who smoked during pregnancy, and reactions to food additives, or preservatives (Gammaitoni, 1997). However, the etiology of ADHD is still unknown. It is unlikely that one etiological factor leads to all cases of ADHD. Instead, it is most likely that an interplay of both psychosocial and biological factors may lead to a final common pathway of the syndrome of ADHD (Cantwell, 1996).

The current clinical view of ADHD is of a disruptive neuro-developmental disorder associated with brain malfunction and a defect in response inhibition (Barkley, 1997; Tannock, 1997). Recent research by Barkley (1997) has concentrated on developing theories of executive functions and their relevance and relationship to deficits in attention and behavioural inhibition. Magnetic Resonance Imaging has facilitated the identification of anomalies in the prefrontal cortex of the brain associated with frontal lobe dysfunction (Barkley, 1997; Barkley, Grodzinsky, & Du Paul, 1992; Seidman, Biederman, Faraone, Weber, & Oullette, 1997).

The prefrontal lobe in the brain is responsible for behaviour modification, countering distractions, and developing awareness of self and time (Barkley, 1997). It is the effective employment of these executive function processes that enable an individual to practice self-control and inhibit, or delay, initial motor and emotional responses to events and actions. The prefrontal cortex (responsible for executive functions) in children with ADHD is smaller than in other children (Barkley, 1997). This evidence supports the long held belief that brain abnormalities are in part responsible for the disorder of ADHD (Seidman et al., 1997).

In the examination of neuropsychological causes of this disorder, Barkley (1997) put forward a “unifying” theory of ADHD that assumes the essential impairment in ADHD is a deficit involving behaviour inhibition. This condition leads to secondary impairments in four neuropsychological abilities: working memory, self regulation of affect/motivation/arousal; internalisation of speech, and reconstitution. The need for such a unifying theory of ADHD became apparent to Barkley when he realised that the clinical view of ADHD outlined in the DSM-IV

could not account for the many cognitive and behavioural deficits associated with this disorder.

While ADHD can have multiple causes, heredity is regarded as being a significant factor in the etiology of this disorder (Barkley, 1990; Cantwell, 1996; Gammaitoni, 1997). For example, Barkley (as cited in Kiffer, 1996) recorded that in children with ADHD, 25% of fathers and 17 to 25% of mothers have the condition. This study revealed that there is a 40% chance that one of the parents has ADHD and a 35% chance that one other child in the family is similarly affected. Recent research supports the notion that ADHD tends to run in families, and attributes this condition to genetic rather than environmental factors (Barkley, 1990; Seidman et al., 1997). No evidence supports the idea that ADHD is caused by faulty parenting or stressful home environments. However, both of these situations can exacerbate ADHD (McFarland, Kolstad, & Briggs, 1995).

More research into the causes of ADHD, and alternative forms of therapy for children with this disorder are needed and should be undertaken by medical and psychological researchers. Treatments that do not utilise medication should be pursued, as well as research into new medications with fewer undesirable side effects (McFarland et al., 1995).

ADHD in the School Environment

Influence of ADHD on Students

Students with ADHD are characterised as being inattentive, impulsive, and overactive, which may lead to a variety of problems within the school setting. These students often experience difficulties in the behavioural components needed

for academic success, such as interacting with others, paying attention, staying seated, starting and completing tasks, following directions, producing consistent work, working independently in the classroom, and keeping track of books, pencils, and assignments (Barkley, 1990; Taylor & Larson, 1998). In particular, students with ADHD are unable to maintain attention for long periods of time, or to sustain a persistent work effort.

According to Koziol, Stout, and Ruben (as cited in Kiffer, 1996), more than 50% of students with ADHD have significant problems of an oppositional nature. This can often lead to disruptive and anti-social behaviour in the classroom, such as arguing, being vindictive, open defiance of class rules, and easily losing emotional control, (Taylor & Larson, 1998). Some children will even steal, fight, lie, and destroy property (Barkley, 1990).

In general, ADHD has negative effects on academic performance throughout a child's entire schooling (Fischer, Barkley, Fletcher, & Smallish, 1993; DuPaul, Guevremont, & Barkley, 1991). A preschool child with ADHD becomes an equally hyperactive, impulsive, and possibly defiant school age child (Barkley, 1990). This is due to the increased school demands for attention and control, as well as frequent negative reinforcement by teachers and peers (Ross & Ross, 1982). In early primary years, teachers may report the student as performing inconsistently and displaying inattentive, talkative and interrupting behaviour (Barkley, 1990). As academic demands increase in later primary school, the student experiences significant difficulties in remaining focused and completing school assignments. Students at this level are already expected to be able to remember, and organise tasks. In

secondary school, these students are expected to cope with the additional demands of frequent physical class changes and increased independence in the learning process (Grynkewich, 1996). Although many of the primary problems associated with ADHD seem to diminish during adolescence (hyperactivity, impulsivity), the secondary problems of this disorder (anti-social activity, academic delay) may persist or intensify (Fischer et al., 1993).

Students with ADHD have a greater likelihood of leaving school prematurely, as well as experiencing academic under-achievement, social problems, and emotional adjustment difficulties (Grynkewich, 1996). Therefore, teachers should be familiar with the influence of ADHD on students in order to design and implement appropriate school programs and classroom strategies (Gardill, DuPaul, & Kyle, 1996).

Assessment of ADHD in Schools

Determining whether a child has ADHD is a multi-faceted process, which should include an evaluation of medical, psychological, educational and behavioural functioning (Grynkewich, 1996). As many biological and psychological problems can contribute to symptoms similar to those exhibited by students with ADHD, clinicians who diagnose ADHD must be aware of other related disorders.

Behavioural and emotional disturbances may coexist with ADHD, with up to 44% of individuals with ADHD also having at least one other psychiatric disorder (Szatsmari, Offord, & Boyle, 1989). Collectively, students with ADHD exhibit more symptoms of excessive anxiety, depression and mood swings, and low self-esteem than their peers (Bohline, 1985; Taylor & Larson, 1998).

Educational difficulties are often associated with ADHD, with an estimated 95% of students with ADHD evidencing academic under-achievement (Barkley, 1990). Recent research using stringent identification criteria for both ADHD and learning disabilities suggests that 20% of students with ADHD also have learning disabilities (Forness, Youpa, Hanna, Cantwell, & Swanson, 1992). Overall, studies have reported co-morbidity figures ranging from 9 to 63% (McKinney, Montague, & Hocutt, 1993).

School assessment of ADHD requires appropriate personnel, preferably a multidisciplinary team including people trained in psycho-educational assessment and student psychopathology. Burnley (as cited in Goldstein & Goldstein, 1998) confirmed that such a team approach is essential for accurately identifying children with this disorder. Careful data collection is needed before school staff can recommend to parents that their child should undergo medical assessment (Goldstein & Goldstein, 1998).

School behaviour can be assessed by using either standardized or informal rating scales and checklists, in conjunction with systematic observations across settings and situations (Sloan, Jensen, & Kettle, 1999). In addition, parental history, report cards, and standardised competency tests are well recognised sources for determining a child's academic progress. School data concerning the child's behaviour, work completion, achievement, and social interaction are an integral part of the assessment process for ADHD (Goldstein & Goldstein, 1998).

Because ADHD symptoms are usually well developed by school age, and are often most clearly and consistently observed in the school environment, teacher

observations are an essential resource in the clinical evaluation of ADHD (Barkley, 1990). Children should be observed in play during recess, as well as in the classroom, to determine the pervasiveness of symptoms. For example, students with ADHD may appear normal on the playground, but may evidence significant attentional or activity levels within the classroom (Reeve, 1990). If children are on medication, observations should include periods when the child is taking medication, as well as periods without medication, in order to monitor the degree of behavioural change (Montague et al., 1994).

The Professional Group for Attention and Related Disorders, comprising North American ADHD researchers in the areas of psychology, psychiatry, pediatrics, and education, recommends an assessment protocol for school assessment (Fowler, as cited in Grynkeiwich, 1996). This protocol consists of two tiers, both of which require many sources of information. The second tier was specifically developed for ADHD diagnosis in school, as often medical or psychological diagnoses are not suited to educational remediation (McBurnett, Lahey, & Pfiffner, 1993). The first tier determines the presence of ADHD symptomatology, while the second tier measures the adverse affect on school performance. In the second tier, classroom observations, academic productivity, psychoeducational tests, and measures of attention are collected. Standardised rating scales and/or structured interviews are ways to identify present symptomatology and to determine the degree of severity.

Treatment/Management of ADHD in the School

While there is no cure for ADHD, a combined treatment of medication and behaviour therapy can help children succeed (Runnheim, Frankenberger, & Hazelkorn, 1996). For children with ADHD to be successful in school, educating teachers and parents about ADHD is crucial. In addition, teachers and parents must work together in achieving a satisfactory management solution (Barkley, 1990; Dunne et al., 1997). Recent studies recommend that a multi-modal approach based on collaboration among parents, students, professionals, and teachers is essential for early and accurate identification of children with ADHD (Barkley, 1997; Fell & Pierce, 1995; Montague, et al., 1994; Sloan, et al., 1999).

Barkley (1990) identified that probably the most difficult decision is when to use medication. Since each child is unique, the decision to undertake medication intervention must be based upon careful consideration of the risks, benefits, and alternatives (Goldstein & Goldstein, 1998). Even though stimulant drugs are a mainstay of treatment, they should not be automatically prescribed or taken lightly (Dunne et al., 1997). For this reason, concern about the increasing use of medication for ADHD, particularly as a stand-alone intervention, has generated considerable public debate and controversy (Goldstein & Goldstein, 1998). Further research is therefore required on the long-term effectiveness of medication treatment, as well as parental satisfaction, to determine optimal prescription practice.

There are three stimulant medications that are used widely in the treatment of ADHD: Methylphenidate (Ritalin), Pemoline (Cylert), and Dextroamphetamine (Dexedrine). Ritalin, or another one of these medications, is given to nine out of ten

children diagnosed with ADHD (Guttman, as cited in Kiffer, 1996). All of these medications lessen distractibility, improve concentration and in some children improve perceptual-motor abilities (Gammaitoni, 1997). However, there are possible side-effects of these medications, including anorexia, stomach aches, headaches, irritability, and insomnia (McFarland et al., 1995). Some children experience mood swings or irritability as the medication wears off, while others may develop tics (i.e., facial grimaces, sniffing, snorting, or other vocalisations). Ritalin exerts an effect in about half an hour, reaches a peak in about two hours, and is gone in four hours (Gammaitoni, 1997). There are no firm guidelines in regard to when a medication needs to be discontinued, but it should be re-evaluated on an annual basis (Barkley, 1990).

In the school environment, teachers need to understand the causes of ADHD, its developmental course, and the common symptoms of this disorder that are displayed in the classroom. Furthermore, teachers should be aware of the effect of specific actions, such as punishment and negative reinforcement, on children with ADHD (Goldstein & Goldstein, 1998). Such knowledge is also an important prerequisite for teachers who wish to adopt behavioural therapy as a means of helping children with ADHD. Behaviour therapy involves a system of positive and negative reinforcements, which are applied in order to bring about the targeted behaviour (McFarland et al., 1995). Where behaviour therapy is used in treatment plans for children diagnosed as ADHD, it should be individualised according to the pattern of target symptoms (Dunne et al., 1997). Behavioural strategies therefore provide teachers with a means of regulating behaviour, and for improving academic

performance, in children with ADHD (Gardill et al., 1996). However, these strategies are often limited in their effectiveness because teachers and parents are unable, or unwilling, to persist with such demanding programs over a long period of time (McFarland et al., 1995).

Teachers must not only be familiar with different behavioural strategies and interventions, but also methods of academic instruction that are appropriate for students with ADHD. An appropriate teaching style would involve the following: positive academic expectations, clarity in giving directions, patience and humour, consistency and firmness (Grynkewich, 1996). Similarly, there are a number of classroom strategies that can be adopted to promote success in students with ADHD, such as predictability, structure, shorter work periods, small teacher-to-student ratios, more individualised instruction, frequent monitoring and checking of work, interesting and interactive lessons (Gardill et al., 1996; Pfiffner & Barkley, 1990).

As well as methods of academic instruction, teachers themselves can directly influence the degree of success that students have in school. Teacher characteristics for the effective management of problem behaviour, including symptoms of ADHD, were identified by Brophy and McCaslin (1992). Such characteristics include a willingness to work personally with problem students, confidence in the ability to effect student improvement, and planning for future problem prevention or for remedial strategies. Other important qualities for teaching students that have special needs include acceptance, warmth, tolerance, and a positive attitude (McCauley & Johnson, 1993).

Teachers’ Attitudes and Knowledge about ADHD

Attitude Theory and Teacher Efficacy

Despite the many differing definitions of attitude, most social psychologists agree that attitudes are learned predispositions toward an evaluative response to an entity with some degree of favour or disfavour (Eagly & Chaiken, 1992), and are represented in memory as knowledge structures (Olson & Zanna, 1993). There are affective, cognitive, and behavioural correlates of attitudes - known as the tripartite model of attitudes (Rosenberg & Hovland, 1960; see Figure1). A relationship may also exist between the attitude and knowledge held by an individual on a certain issue (Pratkanis, 1989).

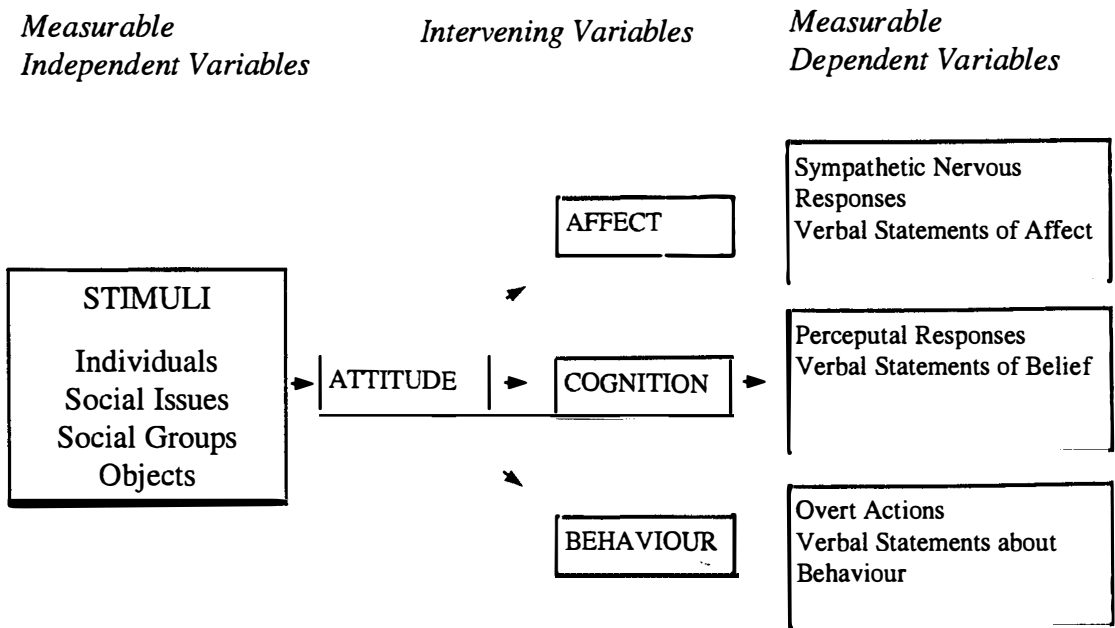


Figure 1. Schematic Representation of the Tripartite Model of Attitudes (adapted from Rosenberg and Hovland, 1960, p.3)

The notion of examining teacher attitude and its relationship to successful student achievement and behaviour management was investigated by Gibson and Dembo (1984). In this study, teacher attitudes about student success were classified as teacher efficacy and separated into two interrelated terms: teaching efficacy and personal efficacy. Teaching efficacy and personal efficacy are the attitude subtypes that address a teacher's belief that students benefit from educational experiences. Teachers with high teaching efficacy are those who believe that they have the capacity to influence student performance and that students benefit from educational experiences. Alternatively, personal efficacy refers to the attitude individual teachers hold about their own ability to effect student change (Grynkewich, 1996).

Reid et al. (1994) examined teachers' self-efficacy in working effectively with ADHD students. Seventy-two percent of a sample of 375 third grade teachers reported having taught a student with ADHD. In regard to previous training in ADHD, 56% of teachers reported having received some training through formal university classes (48%), conferences (17%) or in-service training (44%). Teachers with prior experience in teaching students with ADHD expressed more confidence in adjusting lessons and materials than those teachers without prior experience. The amount of training teachers received in ADHD also influenced their confidence or self-efficacy ratings.

Teachers' Response to ADHD

Teaching is a highly complex process that is substantially influenced by the teacher's thinking and decision-making processes (Clark & Peterson, 1986),

as well as by the contexts in which they teach (Feiman-Nemser & Floden, 1986). Teachers' attitudes influence classroom organisation and management (Brophy, 1983; Gersten, Walker, & Darch, 1988), and teaching practices (Isenberg, 1990; Richardson, Anders, Tidwell, & Lloyd, 1991).

Students with behavioural problems tend to be treated differently by even the most effective teachers (Brophy & Good, as cited in Goldstein & Goldstein, 1998). As a consequence, teachers may negatively reinforce the behaviour of these students by demanding less and calling on them infrequently, praising them in a less positive way, and criticising them more often. This tendency for teachers to hold significantly more negative attitudes for students considered at risk, compared to students who were considered average in achievement and abilities, was investigated by Bay and Bryan (1991). Their results confirmed that at-risk students received more negative comments about their abilities to attend and achieve than did other students.

Similarly, teachers' knowledge of the subject being taught, as well as their knowledge of teaching, influence their teaching performance (Ferguson, 1993), teacher expectation, and student achievement (Brophy, 1987; Miller, 1985). Both teachers' attitude and their knowledge influence classroom practices that, in turn, influence student school success.

Review of Four Studies on Teachers' Attitudes and Knowledge

Many researchers who study school environments for students with ADHD indicate the need for teachers to have positive attitudes and knowledge about this disorder (Barkley, 1990; Fiore, Becker, & Nero, 1993; Goldstein & Goldstein,

1998). Given the importance of these findings for the management of this disorder, there is insufficient research that reports what is a positive teacher attitude towards children with ADHD, or what is an appropriate knowledge base (Grynkewich, 1996; Jerome et al., 1999).

The following discussion will review four studies that specifically addressed teachers' attitudes and knowledge about ADHD. Hawkins et al. (1991) focused on practising teachers from pre-kindergarten through to high school. These teachers were questioned about their attitudes towards ADHD, medication of affected students, and classroom interventions. Eighty-five percent of the 115 respondents reported having taught a student with ADHD, and 71% believed ADHD was not outgrown in adolescence. Only 39% of teachers reported receiving training through coursework, workshops, or in-service training. Of those familiar with ADHD, 31% had previously been instructed on specific identification techniques for ADHD. Interestingly, teachers also reported that many students with ADHD failed to regularly take their prescribed medications.

Germaine (1994) attempted to improve teachers' attitudes and knowledge of ADHD by presenting them with basic written facts about the disorder. This research involved the administration of two tests to a sample of 170 teachers. Before the distribution of a number of information sheets on ADHD, all teachers were required to complete a pre-test. A post-test was then used to assess the impact of these information sheets on the teachers' attitudes and knowledge concerning ADHD. The results of the study showed that certain information improved attitudes and increased knowledge, while other information reinforced negative, or unpopular

beliefs, about children with ADHD. This supports the need for teacher in-service training and development (Pfiffner & Barkley, 1990), as simply providing accurate information does not necessarily provide a complete solution to improving teacher understanding of ADHD.

In a comprehensive study, Jerome et al. (1994) surveyed a large sample of elementary (primary school) teachers from America ($n = 439$) and Canada ($n = 850$) on their knowledge and attitudes about ADHD. Data for this survey were obtained from a self-report questionnaire completed by the teachers. The questionnaire was in two parts: the first, contained 20 multiple choice questions on demographic background (including age, sex, education), teachers' training regarding ADHD, teachers' contact with students diagnosed as ADHD, and teachers' contact with outside professionals specialising in ADHD; the second, consisted of 20 true/false questions concerning teachers' knowledge and attitudes about the essential concepts of ADHD.

American (89%) and Canadian (99%) teachers reported a lack of opportunity to learn about ADHD during the course of their university education. Furthermore, teachers from both the American (98%) and Canadian (97%) samples expressed a strong interest in obtaining additional training in ADHD after graduation. In both samples, teachers regarded ADHD as a legitimate special education problem (approximately 94%), but only 14% of teachers reported having contact with outside professionals for children on ADHD medication. These findings support the need for a closer working relationship between outside professionals and classroom teachers in order to reduce misdiagnosis of ADHD, and to improve medication

management. Teacher in-service training would also need to include dialogue and input from prescribing clinicians.

Both the American and Canadian teachers indicated that they understood ADHD's biological and hereditary bases, and that bad parenting was not a cause of the disorder. Slightly more than 90% of teachers disagreed with the statement, "ADHD children would do better if they tried harder." Other aspects on which teachers from both countries seemed well informed were that medication alone is not the answer, and that reasonable educational interventions exist for the management of ADHD in schools. In contrast, approximately 66% of all teachers agreed with the myth that sugar and/or food additives can often cause ADHD, and a significant number of American (50%) and Canadian (41%) teachers also incorrectly believed that ADHD is outgrown in adolescence. The results from this study also suggested that recently qualified younger teachers, with the benefit of current in-service training regarding ADHD, had a better knowledge of the disorder than those who had been teaching for a longer period without the benefit of in-service training.

In a recent follow-up to the previous study, Jerome et al. (1999) administered the 1994 questionnaire to a Canadian sample of 42 final year education students drawn from the same geographical area as the original sample of practising teachers. These results were then compared to those of the Canadian sample of practising teachers in the previous study. The hypothesis under investigation was that recent pre-service training regarding ADHD offered to education students would lead to improved knowledge beyond that of practising teachers.

The overall score for teachers in-training and practising teachers was very similar, although questions dealing with knowledge of the natural history of ADHD, and its persistence into adolescence, were completed with greater accuracy by practising teachers. However, both groups performed poorly on questions relating to dietary management.

The results showed no evidence that current pre-service training has significantly improved the knowledge of final year student teachers, in comparison to previous samples of practising Canadian teachers. These findings, if confirmed by further studies with larger, more representative samples, have implications for both curriculum development in university education programs, and in-service training of practising teachers.

Conclusion and Future Directions

With the prevalence of ADHD, it is conceivable that in any given primary school classroom at least one student will have ADHD (Graham, as cited in Kiffer, 1996). Given the difficulties that teachers face in providing appropriate instruction for affected children, it is necessary for teachers to be knowledgeable about ADHD, and its associated behavioural disorders, and to possess positive, non-discriminatory attitudes towards the disorder. However, misconceptions still exist about ADHD and the potential for misdiagnosis remains a reality.

The remedy to such problems is to ensure that teachers are recognised as key players in the implementation of a comprehensive assessment process (Burcham, & DeMers, 1995). Each school should have a statement of policy regarding the assessment procedure and intervention for students suspected of having ADHD.

Fell and Pierce (1995) argued that a well-defined school policy can build confidence for parents, the student, teachers, and outside professionals.

Children with ADHD present a professional challenge to their teachers, consequently the effective educational and behavioural management of these students makes the long term process of teaching them much easier. To this end, universities should add ADHD diagnostic procedures and remediation techniques to the education curriculum. Accurate perceptions of the difficulties experienced by children with ADHD should also be of central concern in teacher training programs (Mioduser, Margalit, & Efrati, 1998). Educating teachers about ADHD assists in the early identification of children with this disorder, improves student learning through more effective classroom techniques, helps with monitoring of medication effects, and enhances behaviour modification programs followed at home (Sloan et al., 1999). The better prepared a new teacher is to cope with such a child, the more effective that teacher will be in the classroom when faced with this challenge (McFarland et al., 1995).

Mioduser et al. (1998) concluded that the foundation of a teacher's theoretical knowledge of ADHD is acquired at university, and the classroom provides the day to day reality which teachers require to shape this knowledge into workable plans and strategies. However, both practising teachers and those still in training can benefit from formal training to eliminate any gaps in their knowledge (Jerome et al., 1994). Further training is particularly important as the degree of preparedness (or knowledge) of teachers to work effectively with ADHD students is likely to be a major factor contributing to the success or failure of such students.

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**Knowledge and Attitudes About Attention-Deficit Hyperactivity
Disorder: A Comparison between Practising Teachers
and Undergraduate Education Students**

Bruna Bekle

**A Report Submitted in Partial Fulfilment of the Requirements for the
Award of Bachelor of Science (Psychology) Honours Faculty of
Community Services, Education and Social Sciences, Edith Cowan
University.**

January, 2001

**I declare that this written assignment is my own work and does
not include:**

- (i) material from published sources used without proper
acknowledgement; or**
- (ii) material copied from the work of other students.**

Signed

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Knowledge and Attitudes About Attention-Deficit Hyperactivity Disorder (ADHD): A Comparison between Practising Teachers and Undergraduate Education Students

Abstract

The aim of this study was to compare and contrast the knowledge and attitudes of practising teachers regarding ADHD, with those of undergraduate education students. Such information is important as teachers have a major influence on the success or failure of ADHD students, as well as being able to contribute to the process of early identification, assessment, and treatment. The present study replicated the key elements of earlier studies of American and Canadian teachers by Jerome, Gordon and Hustler (1994) and Jerome, Washington, Laine and Segal (1999). As there is little published literature in this field, and no known comparable Australian work, this research served as a pilot study. Participants were administered a self-report questionnaire designed to determine their demographic background, training in ADHD, attitudes towards the disorder, and general knowledge about essential concepts involved in its diagnosis and treatment. Results supported the hypothesis that although both practising teachers and undergraduate education students have a sound knowledge base of ADHD, some knowledge gaps do exist. Despite similar results for both sample groups, practising teachers achieved higher accuracy on the knowledge-based questions. In contrast, Jerome et al. (1999) found greater difficulty in differentiating between teachers and education students on the basis of factual knowledge. The present study also identified common ADHD myths as the most significant knowledge gap in both groups, particularly in the area of dietary treatment. Attitudes and knowledge were significantly correlated, as indicated by the relationship of high scores on the questionnaire and generally positive attitudes towards ADHD. Most participants regarded ADHD as a valid diagnosis with implications for the school setting, and expressed a desire for comprehensive training. These results have important implications for curriculum development in teacher training and in-service training for practising teachers.

Author:	Bruna Bekle
Supervisors:	Dr Lisbeth T. Pike Dr Phyllis Prout
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Introduction

Background and Definition

Attention Deficit Hyperactivity Disorder (ADHD) is emerging as a significant educational issue for both students diagnosed with this disorder, and the teachers who regularly encounter such students in their classrooms (Gardill, DuPaul, & Kyle, 1996; Tannock, 1998). This diagnostic label applies to children exhibiting significant problems with inattention, impulsivity, and hyperactivity (Barkley, 1990; Cantwell, 1996; Conners, 2000). Such symptoms are also typically associated with deficits in social functioning, including rule-governed behaviour, and in academic or work consistency (Barkley, 1990; Fell & Pierce, 1995). A more detailed psychiatric explanation and list of current diagnostic criteria for ADHD can be obtained from the Diagnostic and Statistical Manual of Mental Disorders, fourth edition, (DSM-IV) of the American Psychiatric Association (1994).

The clinical view of ADHD is of a disruptive neurodevelopmental disorder associated with brain malfunction and a defect in response inhibition (Tannock, 1997). Recent research by Barkley (1997) led to the development of a “unifying” theory of ADHD that assumes the essential impairment in ADHD is a deficit involving behaviour inhibition. This condition causes secondary impairments in four neuropsychological abilities: working memory, self regulation of affect/motivation/arousal, internalisation of speech, and reconstitution. The need for such a unifying theory of ADHD became apparent to Barkley when he realised that the clinical view of ADHD outlined in the DSM-IV could not account for the many cognitive and behavioural deficits associated with this disorder.

ADHD is one of the most commonly diagnosed childhood disorders, and occurs in approximately 3 to 6% of the childhood population (Cantwell, 1996). Diagnosis is based on a clinical picture that begins early in life, is persistent over time, is pervasive across different settings, and causes functional impairment at home, at school, or in leisure time activity (Cantwell, 1996). This disorder is also reported across a diversity of cultures and geographical locations (Tannock, 1998), with boys being over-represented by approximately 3 to 1 (Barkley, 1997). While ADHD can have multiple causes, heredity is regarded as being a significant factor in the etiology of this disorder (Barkley, 1990; Cantwell, 1996; Gammaitoni, 1997). ADHD tends to run in families and is attributed to genetic rather than environmental factors (Barkley, 1990; Seidman et al., 1997). There is no evidence to support the notion that ADHD is caused by faulty parenting or stressful home environments, although these factors can exacerbate the condition (McFarland, Kolstad, & Briggs, 1995).

By definition, a child should exhibit at least some of the diagnostic symptoms of ADHD before the age of seven years (American Psychiatric Association, 1994; Dunne et al., 1997), in which case a diagnosis is inclined to be confirmed by age nine (Grynkewich, 1996). Approximately 50 to 80 percent of diagnosed children continue to experience ADHD symptoms to a significant degree in adolescence (Barkley, 1990). Such persistent symptoms result in diminished school performance and self esteem, as well as an increased risk of developing antisocial behaviours, substance abuse, and psychopathology (Dunne et al., 1997; Pineda, cited in Pineda, 1999).

ADHD in the School Setting

Although ADHD is a heavily researched childhood disorder, there is relatively little information available on its effects in the school setting (Reid, Vasa, Maag, & Wright, 1994), and even less is known about teachers' knowledge of, and attitudes to, the treatment of ADHD (Jerome, Washington, Laine, & Segal, 1999). Of the relatively small number of school-based studies, most have focused upon the effectiveness of teacher observations for the identification of ADHD (Atkins, Pelham, & Licht, 1989; DuPaul & Stoner, 1994), or upon teachers' perceptions regarding medication and treatment (Amirkhan, 1982; Brophy & McCaslin, 1992).

Only a few studies have examined teachers' beliefs and knowledge relating to general issues of identification, diagnostic criteria, and treatment of students with ADHD (Germaine, 1994; Hawkins, Martin, Blanchard, & Brady, 1991; Jerome, Gordon, & Hustler, 1994; Jerome et al., 1999). Findings from these studies suggest teachers need to be increasingly knowledgeable of assessment procedures, as well as instructional, behavioural, and social skill strategies that are appropriate for ADHD. Teachers also need to be able to communicate with physicians and outside professionals who are involved in the treatment of these students (Jerome et al., 1994).

Students with ADHD experience a variety of difficulties at school, including interacting with others, paying attention, following directions, staying seated, starting and completing tasks, working independently in the classroom, producing consistent work, and keeping track of books, pencils, and assignments (Barkley, 1990; Taylor & Larson, 1998). In particular, these students are unable to maintain

attention for long periods of time, or to sustain a persistent work effort. As a consequence, it is estimated that 95 percent of students with ADHD experience academic under-achievement (Barkley, 1990), and at least 10 to 20 percent of such students also have learning disabilities (Forness, Youpa, Hanna, Cantwell, & Swanson, 1992). However, reported co-morbidity figures for ADHD and learning disabilities are highly variable, ranging between 9 and 63 percent (McKinney, Montague, & Hocutt, 1993).

Students with ADHD also have significant problems of an oppositional nature, which can often lead to disruptive and anti-social classroom behaviour, such as arguing, being vindictive, showing defiance, and easily losing emotional control, (Taylor & Larson, 1998). Some children will even steal, fight, lie, and destroy property (Barkley, 1990). Tannock (1998) revealed that comorbidity between ADHD and Oppositional Defiant Disorder and Conduct Disorder occurs in approximately 40 to 90 percent of cases.

In general, ADHD has negative effects on academic performance throughout a child's entire schooling (Fischer, Barkley, Fletcher, & Smallish, 1993; DuPaul, Guevremont, & Barkley, 1991). A preschool child with ADHD becomes an equally hyperactive, impulsive, and possibly defiant school age child (Barkley, 1990). This is due to the increased school demands for attention and control, as well as frequent negative reinforcement by teachers and peers (Ross & Ross, 1982). By secondary school, these students are expected to cope with greater independence in the learning process (Grynkewich, 1996). Although many of the primary problems associated with ADHD diminish during adolescence (hyperactivity, impulsivity), the secondary

problems of this disorder (anti-social activity, academic delay) may persist or intensify (Fischer et al., 1993). Students with ADHD also have a greater likelihood of leaving school prematurely, as well as experiencing academic under-achievement, social problems, and emotional adjustment difficulties (Grynkewich, 1996).

Teacher observations are essential in the clinical evaluation of ADHD, as symptoms are often most clearly and consistently observed in school (Barkley, 1990). Children should be observed at play during recess, as well as in the classroom. For example, students with ADHD may appear normal on the playground, but may evidence significant attentional or activity levels within the classroom (Reeve, 1990). If children are on medication, observations should include periods when the child is taking medication, as well as periods without medication, in order to monitor the degree of behavioural change (Montague, McKinney, & Hocutt, 1994). Although teachers have the opportunity to experience children's response to medication, clinicians do not always use teachers' rating scales for diagnosis and determination of response to treatment. Instead, medical evaluations are often based on subjective parental reports (Gadow, 1986). Even when teachers' rating scales are used, Jerome et al. (1994) cautioned that response bias to the questionnaire can lead to significant variation in behavioural observations between teachers, as well as within teachers over time. Consequently, these researchers recommended obtaining information on individual teachers' knowledge and attitudes regarding ADHD.

While there is no cure for ADHD, a combined treatment of medication and behaviour therapy can help children succeed in school (Runnheim, Frankenberger,

& Hazelkorn, 1996). In addition, teachers and parents must be well informed about ADHD in order to work together on a satisfactory management solution (Barkley, 1990; Dunne et al., 1997). To this end, a multi-modal approach based on collaboration among parents, students, professionals, and teachers has been recommended for the early and accurate identification of children with ADHD (Barkley, 1997; Fell & Pierce, 1995; Montague, McKinney, & Hocutt, 1994; Sloan, Jensen & Kettle, 1999).

Teachers must not only be familiar with different behavioural strategies and interventions, but also methods of academic instruction that are appropriate for students with ADHD (Gardill, DuPaul, & Kyle, 1996). Their teaching style should involve positive academic expectations, clarity in giving directions, acceptance, patience, consistency and firmness (Grynkewich, 1996; McCauley & Johnson, 1993). Teachers themselves can also directly influence the degree of success that students have in school. To this end, Brophy and McCaslin (1992) identified that important qualities for teaching students with ADHD were a willingness to personally work with problem students and to plan for remedial strategies. In particular, these researchers noted that teachers should have confidence in their ability to effect student improvement. This important quality formed the basis of a study by Reid et al. (1994), in which teachers' self-efficacy in working effectively with ADHD students was examined. Comparisons were made between participants with and without prior experience teaching students with ADHD and prior training in ADHD. Their results indicated that teachers with prior experience in teaching students with ADHD expressed more confidence in adjusting lessons and materials,

than those teachers without prior ADHD experience. The amount of training teachers received in ADHD also influenced their confidence or self-efficacy ratings.

Teachers' attitudes and knowledge also influence classroom practices that, in turn, can effect the success of students with ADHD. For this reason teachers need to have positive attitudes and knowledge about the disorder (Barkley, 1990; Fiore, Becker, & Nero, 1993; Goldstein & Goldstein, 1998). In practice, however, students with ADHD and other disruptive behaviour disorders are still more likely to be disadvantaged in the classroom (Algozzine, 1980; Coleman & Gilliam, 1983). For example, teachers tend to hold significantly more negative attitudes for such students at risk compared to students who are considered average in achievement and abilities (Bay & Bryan, 1991; Li, 1985). Even the most effective teachers are inclined to treat such students differently (Goldstein & Goldstein, 1998). As a consequence, teachers may negatively reinforce the behaviour of these students by demanding less and calling on them infrequently, praising them in a less positive way, and criticising them more often. Moreover, teachers' attitudes also influence classroom organisation and management (Brophy, 1983; Gersten, Walker, & Darch, 1988), and teaching practices (Isenberg, 1990; Richardson, Anders, Tidwell, & Lloyd, 1991). In the same way that teacher attitude relates to student success, teacher knowledge of the subject, as well as knowledge of teaching practices, influences teaching performance (Ferguson, 1993), teacher expectation, and student achievement (Brophy, 1987; Miller, 1985).

In a comprehensive study, Jerome et al. (1994) surveyed a sample of 439 American and 850 Canadian elementary (primary school) teachers on their

knowledge and attitudes about ADHD. Significantly, both the American (89%) and Canadian (99%) teachers reported a lack of opportunity to learn about ADHD at university. Furthermore, nearly all of the teachers from the American (98%) and Canadian (97%) samples expressed a strong interest in obtaining additional training in ADHD after graduation. Both samples regarded ADHD as a legitimate special education problem (approximately 94%), but only 14% of these teachers reported having contact with outside professionals for children on ADHD medication. This highlights the need for a closer working relationship between outside professionals and classroom teachers. For example, teacher in-service training should include input from prescribing clinicians.

American and Canadian teachers correctly understood ADHD's biological and hereditary basis, and that bad parenting was not a cause of the disorder. In contrast, approximately 66% of all teachers agreed with the myth that sugar and/or food additives can often cause ADHD, and a significant number of American (50%) and Canadian (41%) teachers also incorrectly believed that ADHD is outgrown in adolescence. The results of this study showed that recently qualified younger teachers, with the benefit of current in-service training regarding ADHD, had a better knowledge of the disorder than those who had been teaching for a longer period without the benefit of in-service training.

In a recent follow-up study, Jerome et al. (1999) administered the 1994 questionnaire to a Canadian sample of 42 final year education students and compared the results to the earlier Canadian sample of practising teachers. Overall scores for teachers in-training and practising teachers were very similar, although

questions dealing with knowledge of the natural history of ADHD, and its persistence into adolescence, were completed with greater accuracy by practising teachers. Both groups performed poorly on questions relating to dietary management. The results showed no evidence that current university training significantly improved the knowledge of final year student teachers, in comparison to practising teachers.

These findings, if confirmed by further studies with larger, more representative samples, have implications for both curriculum development in university education programs, and in-service training of practising teachers. An earlier study of practising teachers by Hawkins et al. (1991) also revealed the inadequacy of training in ADHD. However, teacher training in ADHD needs to be conducted extensively, as simply providing information does not constitute a complete solution (Pfiffner & Barkley, 1990). For example, Germaine (1994) attempted to improve teachers' attitudes and knowledge of ADHD by presenting them with basic written facts about the disorder. While the results of this study showed that certain information improved attitudes and knowledge, other information reinforced negative beliefs about children with ADHD.

The Present Study

The present study of the knowledge and attitudes about ADHD held by practising teachers and undergraduate education students is significant for a number of reasons. Teachers have a major influence on the degree of success of ADHD students, as well as being able to contribute to the process of early identification, assessment, and treatment of the disorder (Reid et al., 1994). Early and accurate

identification of ADHD in children is necessary to provide for their specific educational needs (Fell & Pierce, 1995; Montague et al., 1994). To this end, teachers' expert observational skills and familiarity with age appropriate norms for behaviour can assist parents and medical specialists in the process of diagnosis and treatment of ADHD. For teachers to effectively teach students with ADHD, and to participate in multi-modal management solutions, they need to be well informed about the disorder (Fell & Pierce, 1995). A positive attitude to ADHD is equally important, as many teachers tend to hold a negative view of students displaying disruptive behaviour in the classroom (Bay & Bryan, 1991). Further justification for this study lies in the paucity of published literature in this field, particularly as there is no known comparable Australian work.

This pilot project replicated the key elements of two comparative studies of American and Canadian teachers' knowledge and attitudes about ADHD (Jerome et al., 1994; Jerome et al., 1999). In the first study, the sample of Canadian and American teachers had generally positive attitudes and understood the basic concepts about ADHD. However, most teachers had received little in-service training regarding ADHD, and saw the need for more formal training. In the follow-up study of practising Canadian teachers and Canadian education students, it was shown that current university training in ADHD had not significantly improved the knowledge base of education students in comparison with practising teachers.

These results served as a guide for the formulation of the current research hypothesis that practising primary school teachers and primary education students have a sound knowledge base of ADHD, but some knowledge gaps do exist.

Reasons for concentrating on the primary school environment are that most children with ADHD are identified at the primary level, and primary teachers have the opportunity to spend a greater proportion of each day with the same group of students.

Arising from this hypothesis, the study investigated three research questions:

- Is there a difference in the knowledge of ADHD between the practising teachers sample and the undergraduate education students sample?
- For both samples, is there a relationship between the level of knowledge about ADHD and attitudes towards the disorder?
- How effective is teacher training, including in-service training, in bridging gaps in teachers' knowledge of ADHD, and in improving their attitudes towards the disorder?

Method

Participants

Primary school teachers and undergraduate education students formed the two sample groups, which were recruited using convenience sampling. The first sample of 30 practising teachers from years 1 to 7 was selected from 6 government schools in the Perth Education District. The teachers' ages ranged from 20 to more than 60 years, although the majority of participants fell between 31 and 50 years of age. Female participants (77%) comprised a high proportion of the sample, which reflects the current under-representation of male teachers in the primary school setting. In terms of marital status, 53% of teachers were married with children, 30% had never married, 13% were married without children, and 3% were divorced or widowed. The bulk of the sample (83%) had taught for a minimum of 9 years.

The second sample consisted of 40 fourth (final) year primary education students from a Perth university. The age of students ranged from 20 to 50 years, but most of them were between the ages of 20 and 30 years. This sample, like that of the practising teachers, contained a majority of females (80%). The majority of all students (75%) had never married, 13% were married with children, 8% were married without children, and 5% were either divorced or widowed.

Demographic data for both groups are summarised in Table 1, and additional demographic information for the practising teachers is included in Table 2.

Table 1

Demographic Data for Practising Teachers and Undergraduate Education Students

Variables	Practising Teachers <u>n</u> = 30	Undergraduate Education Students <u>n</u> = 40
<u>Age</u>		
20 – 30 years	6 (20%)	33 (83%)
31 – 40 years	6 (20%)	5 (13%)
41 – 50 years	12 (40%)	2 (5%)
60 +	5 (17%)	--
<u>Gender</u>	23 (77%)	32 (80%)
<u>Marital Status</u>		
Never married	9 (30%)	30 (75%)
Married without children	4 (13%)	3 (8%)
Married with children	16 (53%)	5 (13%)
Divorced or widowed with children	1 (3%)	2 (5%)
<u>Believe ADHD is a Legitimate Educational Problem</u>		
Yes, absolutely	24 (80%)	34 (85%)
Maybe yes	5 (17%)	6 (15%)
Maybe no	1 (3%)	--
<u>Books Read about ADHD</u>		
None	15 (50%)	13 (33%)
1 or 2	12 (40%)	18 (45%)
3 – 5	3 (10%)	8 (20%)
6 – 10	--	1 (3%)
<u>Journal Articles Read about ADHD</u>		
None	5 (17%)	5 (13%)
1 or 2	10 (33%)	16 (40%)
3 – 5	11 (37%)	15 (38%)
6 – 10	3 (10%)	4 (10%)
11 +	1 (3%)	--
<u>Would Benefit from Additional Training</u>		
Yes, absolutely	23 (77%)	26 (65%)
Maybe yes	5 (17%)	14 (35%)
Maybe no	2 (7%)	--

Note. Frequencies are given with percentages inside parentheses. In the case of gender, number and percentage of females is given.

Table 2
Demographic Data for Practising Teachers

Variable	Frequency	Percent
<u>Year Currently Teaching</u>		
Year 1	5	17
Year 2 – year 3	6	20
Year 4 – year 5	8	27
Year 6 – year 7	10	33
Year 7	1	3
<u>Number of Years Taught</u>		
3 – 8 years	5	17
9 – 15 years	7	23
16 – 25 years	13	43
26 or more years	5	17
<u>Educational Level</u>		
Bachelors (2/3 year trained)	13	43
Bachelors (4 year trained)	17	57
<u>Number of Children Taught who were Diagnosed ADHD (over last 2 years)</u>		
None	5	17
1 or 2	11	37
3 – 5	11	37
6 – 10	3	10
11+	--	--
<u>Number of Children Taught, not Diagnosed ADHD, but Should have (over last 2 years)</u>		
None	12	40
1 or 2	15	50
3 – 5	2	7
6 – 10	1	3
11+	--	--

Materials

The model for the self-report questionnaire used in this study was originally developed by Gordon, Parker, and Barkley (1991), and then adopted in later studies by Jerome et al. (1994), and Jerome et al. (1999), to evaluate teachers' knowledge and attitudes regarding ADHD. In this study, the Survey of ADHD questionnaire was modified to include a separate measure of attitudes towards the disorder. This modification served to strengthen the measure of attitudes within the original questionnaire.

Three key areas identified by Jerome et al. (1994) formed the basis of the current survey; these included: ADHD training received by participants, amount of contact teachers had with ADHD students, and participants' knowledge of basic concepts to ADHD. The other key area - amount of contact with outside professionals working with these children – was omitted from this study as it did not relate directly to the research questions. A few questions in the original questionnaire that were specific to the North American school setting were similarly omitted. For example, the questions “What type of class do you teach?” and “Do you think that ADHD should be grounds for exceptional designation in the IPRC process?” were omitted.

This modified survey instrument was administered to the two sample groups, along with a letter to introduce the study and explain provisions for confidentiality (Appendix B). There were two versions of the questionnaire. Practising teachers received a questionnaire arranged in three sections (Appendix C). The first, contained multiple choice questions on demographic background (e.g., age, sex,

education), teaching history (including grades taught and years or experience), teachers' training regarding ADHD, and teachers' contact with students diagnosed as ADHD. In the second section were 20 true/false questions (coded: 1 = true, 2 = false) concerning teachers' knowledge about the essential concepts of ADHD. The last section included a seven-point bipolar semantic differential scale. This scale was based on the original developed by Osgood, Suci and Tannenbaum (1957), and more recently discussed by Eagly and Chaiken (1993). The name of the attitude object "what is your attitude towards ADHD in children?" appeared above a seven-point bipolar sequence that ranged from "favourable" to "unfavourable". Participants were requested to rate their view of ADHD in children by circling a number (1-7) that corresponded with their personal viewpoint.

The questionnaire administered to the sample of undergraduate education students was the same, except for the omission of questions relating to teaching history in the first section (Appendix D).

Procedure

Ethics approval was obtained from Edith Cowan University's Ethics Committee prior to the commencement of this research. A copy of the ethics approval notice and research proposal was then lodged with the Education Department of Western Australia. Upon consideration of the project's merits, the Acting Director General provided a letter encouraging teachers to participate in what was considered a very worthwhile area of enquiry (Appendix E).

This introductory letter was delivered in person to the Principal of each of the six primary schools in the sample group, in order to request their assistance in

the administering the questionnaire. Principals of each participating school were provided with information about the general aims and significance of this study, as well as a commitment to make available details of the final results. The Principal then approached individual teachers to seek their voluntary participation. If the teacher agreed to participate in the study, a suitable timeframe for the completion of the self-report questionnaire was arranged. All teachers were requested to return the completed questionnaires to the Principal's office for later collection.

For the sample of undergraduate education students, the Co-ordinator for the primary teaching programme at a Perth University was similarly approached and given an explanation of the study, as well as a commitment to provide feedback on the outcomes. With the Co-ordinator's approval, the relevant lecturer was approached for permission to enter their class, at a pre-arranged time, to administer the questionnaire. The entire class was given a brief explanation of the study's aims, significance, and ethical issues by the researcher. Those students who agreed to participate were asked to leave the completed questionnaires on a desk by the door as they left the classroom.

Ethical Considerations

Ethics approval from Edith Cowan University was conditional upon the observance of recognised ethical procedures in the administration of questionnaires. All participants were provided with a covering letter giving information about the research project, the intent of the proposed questionnaire, and advice that the study may be published. The covering letter explained that participation was voluntary, and included an assurance of confidentiality and anonymity. Participants were not

requested to sign the attached consent document, but conveyed their consent to the researcher by ticking the relevant boxes (Appendix F). In addition, participants were specifically advised that no names and addresses, or other identifying information, should be entered on the questionnaire.

The researcher and project supervisors were identified by name and telephone number so that participants could contact them to discuss any query. In particular, it was stressed that the questionnaire was not intended as a test of competence. Furthermore, no incentives, monetary or otherwise, were offered to participants.

Results

Teacher and Education Student Knowledge about ADHD

An independent t-test was performed on scores from the 20 true/false questions, to determine whether the two sample groups differed in their knowledge about ADHD. Assumptions of normality and homogeneity of variance were met. A significant difference was found, $t(68) = 3.41$, $p < .05$, indicating that practising teachers ($M = 16.57$, $SD = 1.8$) scored slightly higher than undergraduate education students ($M = 15.03$, $SD = 1.9$) regarding knowledge about ADHD.

Scores from the true/false questions were also analysed to determine whether consistent knowledge gaps existed between the two groups (the answer code for these questions is included in Appendix G). The 20 questions were grouped according to the following themes: biological and non-volitional factors, family influences, causation, medical and educational interventions, and ADHD myths. Table 3 shows teacher response to the questionnaire expressed as a percentage correct score to the 20 true/false questions regarding ADHD.

Biological and non-volitional factors

Data suggested that most practising teachers and education students agree with the notion that ADHD is attributed to biological causation and not weakness of character. For example, 94% of teachers and 83% of education students agreed with the statement that “ADHD children are born with biological vulnerabilities toward inattention and poor self-control”. All of the teachers and most students (93%) agreed that ADHD children do not misbehave primarily because they don’t want to follow rules and complete assignments. Similarly, the majority of teachers (94%)

Table 3

Teacher Response Expressed as a Percentage Correct Score to 20 True/False Questions Regarding ADHD

Questions		Practising Teachers	Undergraduate Education Students
		$\underline{n} = 30$	$\underline{n} = 40$
9	ADHD can be caused by poor parenting practices.	70	73
10	ADHD can often be caused by sugar or food additives.	53	48
11	ADHD children are born with biological vulnerabilities toward inattention and poor self-control.	93	83
12	A child can be appropriately labelled as ADHD and not necessarily present as over-active	97	75
13	ADHD children always need a quiet, sterile environment in order to concentrate on tasks	93	90
14	ADHD children misbehave primarily because they don't want to follow rules and complete assignments.	100	93
15	The inattention of ADHD children is not primarily a consequence of defiance, oppositionality, and an unwillingness to please others.	93	85
16	ADHD is a medical disorder that can only be treated with medication.	73	78
17	ADHD children could do better if they only would try harder.	93	90
18	Most ADHD children outgrow their disorder and are normal as adults.	70	58
19	ADHD can be inherited.	83	43
20	ADHD occurs equally as often in girls as in boys.	90	78
21	ADHD occurs more in minority groups than in Caucasian groups.	100	98
22	If medication is prescribed, educational interventions are often unnecessary.	83	85
23	If a child can get excellent grades one day and awful grades the next, then he must not be ADHD	100	90
24	Diets are usually not helpful in treating most children with ADHD	23	23
25	If a child can play Nintendo for hours, he probably isn't ADHD.	100	88
26	ADHD children have a high risk for becoming delinquent as teenagers.	73	70
27	ADHD children are typically better behaved on 1-to-1 interactions than in a group.	93	80
28	ADHD often results from a chaotic, dysfunctional family life.	73	80

and students (85%) correctly responded that “the inattention of ADHD children is not primarily a consequence of defiance, oppositionality, and an unwillingness to please others”. Nearly all of the teachers (94%) and students (90%) disagreed with the statement that “ADHD children could do better if they only would try harder”.

Family influences

Undergraduate students appeared better informed than practising teachers regarding family influences on ADHD. A high proportion of teachers (70%) and students (73%) understood that ADHD was not caused by poor parenting. Furthermore, 74% of teachers and 80% of students did not agree that “ADHD often results from a chaotic, dysfunctional family life”

Causation

All participants, except one student, agreed that ADHD seemed unrelated to racial background. However, practising teachers appeared to be better informed than undergraduate students in the area of causation. The majority of teachers (84%) compared to only 43% of students agreed with the statement that “ADHD can be inherited”. A greater proportion of teachers (90%), compared to students (78%), disagreed with the statement that “ADHD occurs equally as often in girls as in boys”.

Medical and educational interventions

Similar results were obtained for practising teachers and undergraduate students in the area of medical and educational interventions. Encouragingly, 94% of teachers and 90% of students disagreed with the statement that “ADHD children always need a quiet sterile environment in order to concentrate on tasks”. A reduced

proportion of teachers (74%) and students (78%) disagreed with the statement that “ADHD is a medical disorder that can only be treated with medication”. Both teachers (84%) and students (85%) also correctly disagreed with the statement “if medication is prescribed, education interventions are often unnecessary”. However, more teachers (94%) agreed with the statement that “ADHD children are typically better behaved on 1-to-1 interactions than in a group”, than students (80%).

ADHD myths

Mixed results were obtained for ADHD myths. Both sample groups obtained low scores for the questions concerning diet. For example, 47% of practising teachers and 53% of education students agreed that “ADHD can often be caused by sugar or food additives”. In addition, 77% of teachers and 78% of students saw diet as being useful in the treatment of ADHD children.

However, teachers appeared better informed than education students in regard to other ADHD myths. Nearly all teachers (97%), compared with only 75% of students, agreed with the statement that “a child can be appropriately labelled as ADHD and not necessarily present as over-active”. A greater proportion of teachers (70%) than students (58%) disagreed with the myth that “most ADHD children outgrow their disorder and are normal as adults”. All teachers and 90% of students disagreed with the statement “if a child can get excellent grades one day and awful grades the next, then he must not be ADHD”. Similarly, all teachers disagreed with the statement “if a child can play Nintendo for hours, he probably isn’t ADHD”, while only 13% of students agreed with this statement. However, only a slightly

higher number of teachers (74%) than students (70%) agreed that “ADHD children have a high risk for becoming delinquent as teenagers”.

Teacher and Education Student Attitudes towards ADHD

The assumption of normality was violated for the independent samples t-test. Therefore, a Mann-Whitney nonparametric test was conducted on the attitude scores for the samples of practising teachers and undergraduate education students, to determine whether attitude differed between the two groups. The result was not significant, $z = -1.69$, $p > .05$.

Relationship between Knowledge and Attitudes

The results of a bivariate correlation for the two sample groups indicated that knowledge and attitudes were significantly correlated, $r = .29$, $p < .05$.

Training in ADHD

The majority of practising teachers had no opportunity (77%) to learn about ADHD during the course of their education at university. In contrast, 95% of the current education students received some form of training regarding ADHD, although only 10% reported having received extensive training. The amount of training received by participants in the two samples is shown in Figures 1 and 2. Moreover, a high proportion of practising teachers (77%) and education students (65%) firmly believed that they would benefit from extra training, while a further 17% of teachers and 35% students thought that there might be some benefit in additional training. Figure 3 indicates that only 10% of practising teachers had received comprehensive training in ADHD.

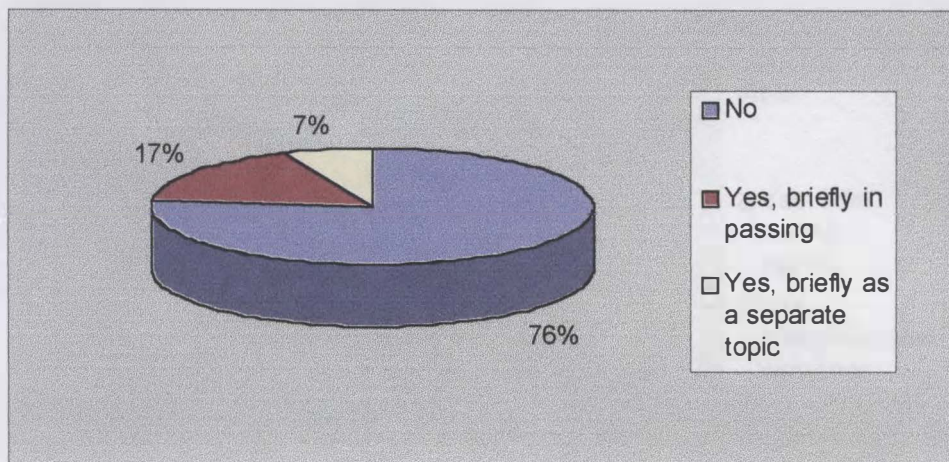


Figure 1. Teacher training received by practising teachers

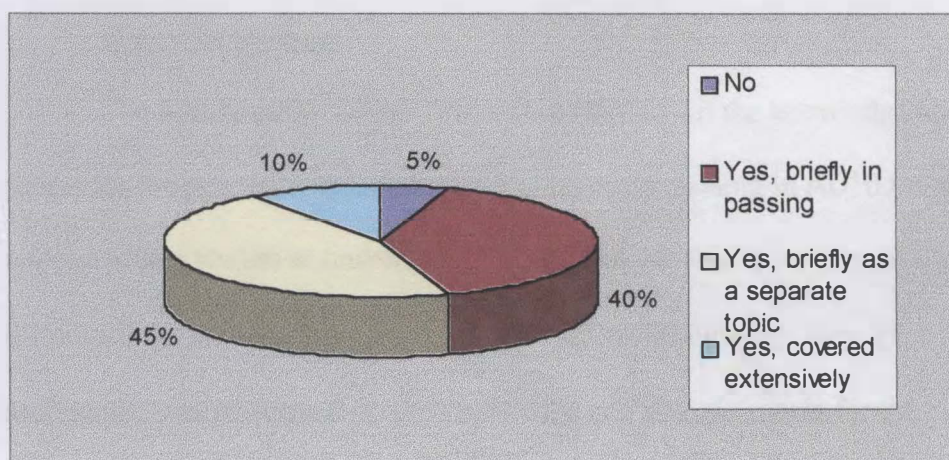


Figure 2. Teacher training received by undergraduate education students.

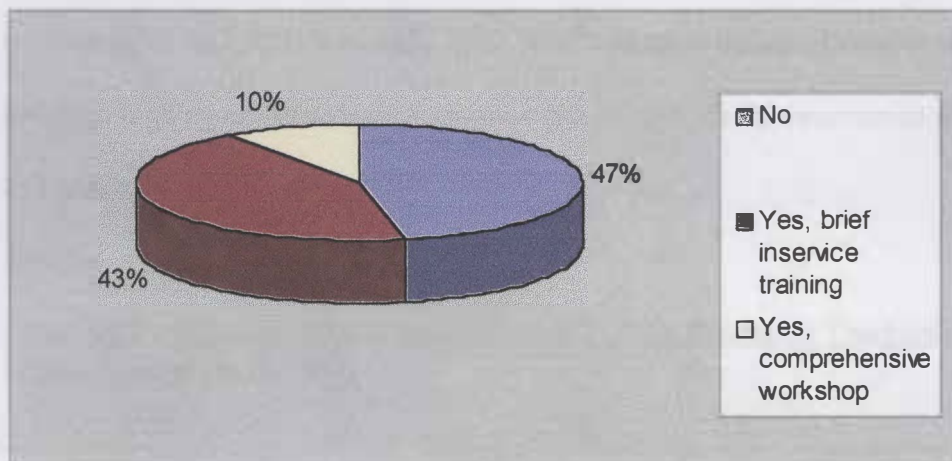


Figure 3. In-service training received by practising teachers

Due to the non-normality of the data, three Kruskal-Wallis tests were conducted to determine the effectiveness of teacher training, including in-service training, in improving knowledge and attitudes towards ADHD.

ADHD Training in undergraduate education programmes and in-service training

The first Kruskal-Wallis Test was performed on the knowledge and attitude scores for the practising teachers who had received training in ADHD in their earlier undergraduate studies at university. Results indicate that there was no significant difference for knowledge, $\chi^2(1) = .04$, $p > .05$, or attitude, $\chi^2(1) = .79$, $p > .05$. The second test was performed on the knowledge and attitude scores for the current sample of university education students who had received training in ADHD. There was no significant difference for knowledge, $\chi^2(2) = .46$, $p > .05$, however, there was a significant difference for attitude, $\chi^2(2) = .68$, $p < .05$. Interestingly, the

undergraduate students' mean rank was highest for attitude when they had received no training in ADHD (mean rank, 33.5), less with brief training (mean rank, 18.6), and then high again for extensive training (mean rank 30.1); mean ranks are shown in Table 4.

Table 4

Mean Rank of Undergraduate Training in ADHD for Practising Teachers and Current Education Students

Variable	Training	N	Mean Rank
	Practising Teachers		
Attitude	No Training	23	14.74
	Brief Training	7	18.00
Knowledge	No Training	23	15.67
	Brief Training	7	14.93
	Education Students		
Attitude	No Training	2	33.50
	Brief Training	34	18.60
	Extensive Training	4	30.13
Knowledge	No Training	2	17.50
	Brief Training	34	20.29
	Extensive Training	4	23.75

The third test was performed on the knowledge and attitude scores of practising teachers who had received ADHD in-service training. The test is not significant for knowledge, $\chi^2(2) = .08$, $p > .05$, or attitude, $\chi^2(2) = .98$, $p > .05$.

Practising teachers who had received no training had a marginally higher mean rank for knowledge than both those who had received brief in-service training, or had

attended a comprehensive workshop (see Table 5). However, attitude improved with an increased level of training.

Table 5

Mean Rank of In-Service Training Received by Practising Teachers

Variable	Training	<u>N</u>	Mean Rank
Attitude	No	14	14.29
	Yes, Brief In-service training	13	15.88
	Yes, Comprehensive Workshop	3	19.5
Knowledge	No	14	15.86
	Yes, Brief In-service training	13	15.38
	Yes, Comprehensive Workshop	3	14.33

Practising teachers’ experience with ADHD children

To determine the effect on teachers’ knowledge and attitudes towards ADHD, a Kruskal-Wallis test was conducted on the knowledge and attitude scores of teachers who had taught children with this disorder over the last two years. The result was not significant for knowledge, $\chi^2(3) = 3.3, p > .05$, or attitude, $\chi^2(3) = 2.7, p > .05$. However, the mean ranks for teachers’ knowledge and attitude increased with greater numbers of ADHD children taught; mean ranks are shown in Table 6. Figure 4 shows that only 17% of practising teachers reported that they had not taught any students diagnosed with ADHD in this period.

Table 6

Number of children with ADHD taught over last two years (1998 - 2000)

Variable	Diagnosed ADHD	N	Mean Rank
Attitude	None	5	11.60
	1 or 2	11	14.09
	3 to 5	11	17.59
	6 to 10	3	19.50
Knowledge	None	5	11.70
	1 or 2	11	16.50
	3 to 5	11	14.32
	6 to 10	3	22.50

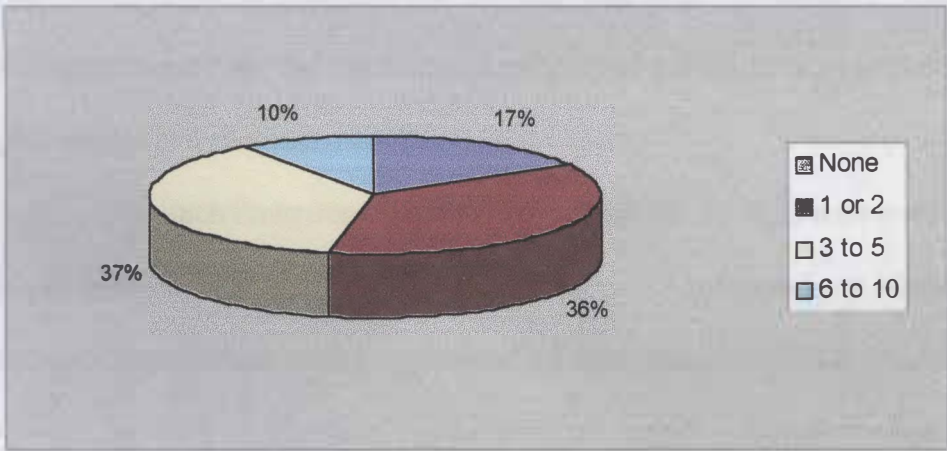


Figure 4. Practising teachers experience of children with ADHD over the last two years (1998 - 2000)

Discussion

As a pilot study, the capacity for generalising the findings of this research is limited by the small sample size and the nature of the sample (i.e., a convenience sample). Furthermore, females were well over-represented in both the practising teacher and education student samples. A similar over-representation of females, particularly of younger age, was noted by Jerome et al. (1999). However, these researchers did not find any correlation between gender and accuracy on the questionnaire. Consequently, this particular aspect was not investigated in the present study. In addition, the original questionnaire was limited in scope and of unknown validity (Jerome et al., 1994); therefore, these limitations also apply to the modified versions used in this study. In the formulation of the research design it was also not possible to account for the following variables: quality of training the participants received, and the degree of severity of ADHD in those students that participants had encountered.

With such limitations in mind, the findings of this study supported the hypothesis that although both practising teachers and undergraduate education students have a sound knowledge base of ADHD, some knowledge gaps do exist. Overall accuracy on the questionnaire in regard to basic concepts concerning the disorder was high for the two sample groups, although there were still some gaps in knowledge, particularly in the area of common ADHD myths. Similar results in regard to teachers' knowledge about ADHD were reported by Jerome et al. (1994) and Jerome et al. (1999).

Three research questions were identified in this study, the first of which dealt with the difference in the knowledge of ADHD between practising teachers and undergraduate students. While the knowledge base of both sample groups in this survey was similar, there was still a statistically significant difference between the two total group scores. Collectively, the practising teachers recorded slightly higher accuracy than the sample of education students. The knowledge profiles suggested that the two groups had similar perceptions of biological and non-volitional factors, and family influences. Similar results were also obtained for the questions relating to medical and educational interventions, with the exception that practising teachers demonstrated a slightly better understanding of the behaviour of ADHD children. This exception may be interpreted as practising teachers having superior knowledge based on their experience with ADHD children in the classroom.

While Jerome et al. (1999) reported a very similar knowledge base for practising teachers and education students, the present study found that practising teachers were better informed regarding the causes of the disorder, as well as in the area of ADHD myths. The majority of teachers, compared to less than half of the education students, understood that heredity is a significant factor in the etiology of the disorder (cf. Barkley, 1990; Cantwell, 1996; Gammaitoni, 1997). Similarly, a greater proportion of teachers correctly identified that ADHD did not occur equally as often in girls as in boys.

In the studies by Jerome et al. (1994) and Jerome et al. (1999), ADHD myths were clearly identified as being the greatest area of deficiency in knowledge. In particular, these researchers found that many teachers still perceived non-medical

therapies, such as diets, as being effective, and regarded the disorder as being outgrown at adolescence. Such findings were also confirmed in the present study. Both sample groups performed poorly on questions relating to dietary treatment of ADHD. Confronted with the same result, Jerome et al. (1999) suggested that poor training compounded by media myths may offer a possible explanation. In addition, a higher proportion of education students than teachers held the misconception that a child with ADHD always presents as over-active. These students also had a less accurate view of the persistence of ADHD symptoms into adolescence. As more than half of all children with ADHD continue to experience such symptoms into adolescence, secondary school teachers are also faced with the challenge of having to recognise and manage ADHD in students (Barkley, 1990; Jerome et al., 1999).

A teacher's knowledge about ADHD is inter-related with their general attitude towards the condition. For example, some teachers hold a negative view of working with children that display disruptive behaviour disorders, such as ADHD (Algozzine, 1980; Coleman & Gilliam, 1983). To this end, research suggests that such a negative view might be improved by exposing those teachers to up-to-date information, which explains the nature of the condition and the likely response of affected students to appropriate treatment (Li, 1985).

The second research question addressed the relationship between the level of knowledge about ADHD and attitudes towards the disorder. In the current study, there was a significant correlation between attitude towards and knowledge about ADHD for both groups. Results indicated there was a relationship between high scores on the questionnaire and generally positive attitudes towards ADHD. In

addition, the majority of practising teachers and education students regarded ADHD as a legitimate educational problem.

As a first step in preparing teachers to better serve those students who have ADHD, it is necessary to determine what teachers know about this disorder (Jerome et al., 1994). Such information can also assist those responsible for delivering in-service training to practising teachers. It is even more important that this information is made available for the training of undergraduate education students, in order to provide them with more appropriate professional preparation to address the needs of ADHD students in their future classrooms (Jerome et al., 1999). To this end, both sample groups expressed an interest in receiving more training to help manage ADHD children in the classroom. Similarly, Canadian and American teachers also reported a lack of opportunity to learn about ADHD at university (Jerome et al., 1994).

The third research question related to the effectiveness of teacher training in bridging gaps in teachers' knowledge of ADHD, and in improving their attitudes towards the disorder. In the present sample, practising teachers had received very little ADHD training as part of their earlier university studies, and just over half had received some form of brief in-service training throughout their teaching career. The university and in-service training received by practising teachers did not improve their knowledge about ADHD. However, teachers appeared to show an improvement in attitudes to ADHD with university training and comprehensive in-service workshops; these findings were not statistically significant.

In the education student sample, most participants reported having received training in ADHD. For the majority of these students the topic was covered only briefly as part of their overall teacher training, although a few students claimed extensive training or no training. The results indicated that as the level of ADHD training received by students increased, there was a corresponding decrease in their knowledge gaps; these findings were not statistically significant. However, a significant result was achieved for students' attitudes towards ADHD. Surprisingly, the most positive attitudes to ADHD were reported by those students who had received either no training or extensive training. Students with only brief training in ADHD had the least favourable attitudes to the disorder, perhaps as a result of their awareness of the condition and an inadequate understanding of the key concepts. In relation to this problem, teacher training in ADHD should be conducted extensively to eliminate reinforcement of negative beliefs (Germaine, 1994; Pfiffner and Barkley, 1990).

While the foundation of a teacher's theoretical knowledge of ADHD is acquired at university, the classroom also provides the day to day reality that teachers require to shape this knowledge into workable plans and strategies (Mioduser, Margalit, & Efrati, 1998). In fact, Jerome et al. (1994) reported that years of classroom teaching could compensate for the lack of previous education around ADHD problems. The present study also showed that knowledge and attitudes to ADHD improved in practising teachers with the number of ADHD children taught. Such experience provides teachers with greater confidence and self-efficacy in teaching students with ADHD (Reid et al., 1994).

In addition, practising teachers and those still in training can benefit from formal training to eliminate any gaps in their knowledge (Jerome et al., 1994). Further training is particularly important as the degree of preparedness (or knowledge) of teachers to work effectively with ADHD students is likely to be a major factor contributing to the success or failure of such students. Accurate perceptions of the difficulties experienced by ADHD children should be of central concern in teacher training programs (Mioduser et al., 1998). Educating teachers about ADHD could aid the early identification of children with ADHD, improve student learning through more effective classroom strategies, assist in the design and implementation of appropriate school programs help with monitoring of medication effects, and enhance behaviour modification programs followed at home (Gardill, DuPaul, & Kyle, 1996; Sloan, Jensen, & Kettle, 1999).

The results of this study point to the need for further teacher training that directly addresses the needs of students with ADHD in the classroom. Teachers themselves have also expressed a desire for more comprehensive training in ADHD. These findings merit replication and, if confirmed in larger samples, have important implications for curriculum development and teacher training, and in identifying specific knowledge gaps that need to be addressed by in-service training of practising teachers. Future related research could also evaluate the quality and comprehensiveness of existing training in ADHD provided at undergraduate level by universities, and as in-service workshops for practising teachers. This may help to explain the underlying reasons for teachers' knowledge gaps in areas, such as commonly held ADHD myths.

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Appendix A: DSM-IV Diagnostic Criteria for ADHD

The following criteria for ADHD is listed in the Diagnostic and Statistical Manual of Mental Health Disorders, fourth edition (DSM-IV) of the American Psychiatric Association (1994):

Attention-Deficit/Hyperactivity Disorders

A Either (1) or (2) must be present:

- (1) Inattention: At least six of the following symptoms of inattention have persisted for at least six months to a degree that is maladaptive and inconsistent with developmental level:
 - (a) often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities;
 - (b) often has difficulty sustaining attention in tasks or play activities;
 - (c) often does not seem to listen to what is being said to him or her;
 - (d) often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions);
 - (e) often has difficulties organizing tasks and activities;
 - (f) often avoids, expresses reluctance about, or has difficulties engaging in tasks that require sustained mental effort (such as schoolwork or homework);

- (g) often loses things necessary for tasks or activities (eg school assignments, pencils, books, tools, or toys);
 - (h) is often easily distracted by extraneous stimuli;
 - (i) is often forgetful in daily activities.
- (2) **Hyperactivity-Impulsivity:** At least five of the following symptoms of hyperactivity-impulsivity have persisted for at least six months to a degree that is maladaptive and inconsistent with developmental level:

Hyperactivity

- (a) often fidgets with hands or feet or squirms in seat;
- (b) leaves seat in classroom or in other situations in which remaining seated is expected;
- (c) often runs about or climbs excessively in situations where it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness);
- (d) often has difficulty playing or engaging in leisure activities quietly;
- (e) is always “on the go” or acts as if “driven by a motor”;
- (f) often talks excessively.

Impulsivity

- (g) often blurts out answers to questions before the questions have been completed;

- (h) often has difficulty waiting in lines or awaiting turn in games or group situations;
 - (i) often interrupts or intrudes on others (eg butts into others' conversations or games)
- B Some symptoms that caused impairment were present before age seven.
- C Some symptoms that cause impairment are present in two or more settings (eg at school, work, and at home).
- D There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.
- E Does not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia or other Psychotic Disorder, and is not better accounted for by Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder (pp. 83-85)

Appendix B: Letter to Participants

Survey of teachers' (practising and undergraduate) knowledge of Attention-Deficit Hyperactivity Disorder (ADHD)

The present research has been designed and will be undertaken by Bruna Bekle as part of her course requirements for her Bachelor of Science, Honours (Psychology) at Edith Cowan University. The purpose of the attached questionnaire is to evaluate the knowledge that teachers have about Attention Deficit Hyperactivity Disorder (ADHD). Such information is important as teachers have a major influence on the success of students, particularly those with ADHD. The results of this research will benefit student teacher training and curriculum development, as well as in-service training of practising teachers, by identifying specific knowledge gaps that need to be addressed.

This research will be presented in a thesis and may also be used in a publication, but no individual participant will be identified. The research project has been reviewed by the School of Psychology's Ethics Committee at Edith Cowan University. Your participation is voluntary, and should you decide to participate, you would be free to withdraw at any time during the study. In order to guarantee your anonymity, you do not have to sign a consent form, and your name will not be recorded at any stage.

The questionnaire will take approximately 10 minutes to complete, and a report of the research results will be available after November 2000 by contacting the researcher on the telephone number listed below. If you have any questions concerning the project, please do not hesitate to contact either myself or one of my supervisors on the following numbers:

Bruna Bekle
Honours Student, Edith Cowan University
[REDACTED] (W), [REDACTED] (H)

Dr Lisbeth Pike
Head of School of Psychology, Edith Cowan University
9400 5535

Dr Phyllis Prout
School of Psychology, Edith Cowan University
9400 5317

Appendix C: Questionnaire for Practising Teachers

SURVEY OF ADHD (Questionnaire)SECTION A

INSTRUCTIONS: Please circle your selection
Please select only one response for each

<p>1 Which year do you teach?</p> <ul style="list-style-type: none"> a Year 1 – Year 2 b Year 3 – Year 4 c Year 5 – Year 6 d Year 7 	<p>5 What is your marital status?</p> <ul style="list-style-type: none"> a Never married b Married without children c Married with children d Divorced or widowed with children e Divorced or widowed without children
<p>2 How many years have you taught school (After graduation)?</p> <ul style="list-style-type: none"> a 1 – 2 years b 3 – 8 years c 9 – 15 years d 16 – 25 years e 26 or more years 	<p>6 What is your highest level of education?</p> <ul style="list-style-type: none"> a Bachelors (3 year b Bachelors (4 year c Masters d Doctorate
<p>3 How old are you?</p> <ul style="list-style-type: none"> a 20 – 30 years b 31 – 40 years c 41 – 50 years d 60 + 	<p>7 Did you receive any instruction about ADHD as part of your teacher training?</p> <ul style="list-style-type: none"> a No b Yes, briefly in passing c Yes, briefly as a separate topic d Yes, covered extensively
<p>4 What is your sex?</p> <ul style="list-style-type: none"> a Male b Female 	<p>8 Have you received any training about ADHD after you began teaching?</p> <ul style="list-style-type: none"> a No b Yes, brief inservice training c Yes, comprehensive workshop d Yes post-graduate course

<p>9 About how many books have you read about ADHD?</p> <p>a None b 1 or 2 c 3 – 5 d 6 – 10 e 11+</p>	<p>12 How many children have you taught over the last two years whom you know were not diagnosed as ADHD but you think should have been?</p> <p>a None b 1 or 2 c 3 – 5 d 6 – 10 e 11+</p>
<p>10 About how many articles (Professional/ otherwise) have you read about ADHD?</p> <p>a None b 1 or 2 c 3 – 5 d 6 – 10 e 11+</p>	<p>13 Do you agree that ADHD is a legitimate educational problem?</p> <p>A Yes, absolutely B Maybe yes C Maybe no D No, absolutely E Don't know</p>
<p>11 How many children have you taught over the last two years whom your know were diagnosed as ADHD?</p> <p>a None b 1 or 2 c 3 – 5 d 6 – 10 e 11+</p>	<p>14 Do you feel you could benefit from additional training surrounding the evaluation and treatment of ADHD?</p> <p>a Yes, absolutely b Maybe yes c Maybe no d No, absolutely</p>

SECTION B

INSTRUCTIONS: Please circle your selection (True or False)
Please select only one response for each

<p>15 ADHD can be caused by poor parenting practices.</p> <p>T F</p>
<p>16 ADHD can often be caused by sugar or food additives.</p> <p>T F</p>
<p>17 ADHD children are born with biological vulnerabilities toward inattention and poor self-control.</p> <p>T F</p>

18	A child can be appropriately labelled as ADHD and not necessarily present as over-active.	T	F
19	ADHD children always need a quiet, sterile environment in order to concentrate on tasks.	T	F
20	ADHD children misbehave primarily because they don't want to follow rules and complete assignments.	T	F
21	The inattention of ADHD children is not primarily a consequence of defiance, oppositionality, and an unwillingness to please others.	T	F
22	ADHD is a medical disorder that can only be treated with medication.	T	F
23	ADHD children could do better if they only would try harder.	T	F
24	Most ADHD children outgrow their disorder and are normal as adults.	T	F
25	ADHD can be inherited	T	F
26	ADHD occurs equally as often in girls as in boys	T	F
27	ADHD occurs more in minority groups than in Caucasian groups.	T	F

28 If medication is prescribed, educational interventions are often unnecessary
T F
29 If a child can get excellent grades one day and awful grades the next, then he must not be ADHD
T F
30 Diets are usually not helpful in treating most children with ADHD
T F
31 If a child can play Nintendo for hours, he probably isn't ADHD
T F
32 ADHD children have a high risk for becoming delinquent as teenagers
T F
33 ADHD children are typically better behaved on 1-to-1 interactions than in a group
T F
34 ADHD often results from a chaotic, dysfunctional family life.
T F

SECTION C

INSTRUCTIONS: Please circle the number that corresponds with your personal viewpoint of ADHD in children

What is your attitude towards ADHD in children?								
Favourable	7	6	5	4	3	2	1	Unfavourable

Appendix D: Questionnaire for Undergraduate Education Students

SURVEY OF ADHD (Questionnaire)SECTION A

INSTRUCTIONS: Please circle your selection
Please select only one response for each

<p>1 How old are you?</p> <p>a 20 – 30 years</p> <p>b 31 – 40 years</p> <p>c 41 – 50 years</p> <p>d 60 +</p>	<p>5 About how many books have you read about ADHD?</p> <p>a None</p> <p>b 1 or 2</p> <p>c 3 – 5</p> <p>d 6 – 10</p> <p>e 11+</p>
<p>2 What is your sex?</p> <p>a Male</p> <p>b Female</p>	<p>6 About how many articles (Professional/ otherwise) have you read about ADHD?</p> <p>a None</p> <p>b 1 or 2</p> <p>c 3 – 5</p> <p>d 6 –10</p> <p>e 11+</p>
<p>3 What is your marital status?</p> <p>a Never married</p> <p>b Married without children</p> <p>c Married with children</p> <p>d Divorced or widowed with children</p> <p>e Divorced or widowed without children</p>	<p>7 Do you agree that ADHD is a legitimate educational problem?</p> <p>a Yes, absolutely</p> <p>b Maybe yes</p> <p>c Maybe no</p> <p>d No, absolutely</p> <p>e Don't know</p>
<p>4 Did you receive any instruction about ADHD as part of your teacher training?</p> <p>a No</p> <p>b Yes, briefly in passing</p> <p>c Yes, briefly as a separate topic</p> <p>d Yes, covered extensively</p>	<p>8 Do you feel you could benefit from additional training surrounding the evaluation and treatment of ADHD?</p> <p>a Yes, absolutely</p> <p>b Maybe yes</p> <p>c Maybe no</p> <p>d No, absolutely</p>

SECTION B

INSTRUCTIONS: Please circle your selection (True or False)
Please select only one response for each

9 ADHD can be caused by poor parenting practices.

T F

10 ADHD can often be caused by sugar or food additives.

T F

11 ADHD children are born with biological vulnerabilities toward inattention and poor self-control.

T F

12 A child can be appropriately labelled as ADHD and not necessarily present as over-active.

T F

13 ADHD children always need a quiet, sterile environment in order to concentrate on tasks.

T F

14 ADHD children misbehave primarily because they don't want to follow rules and complete assignments.

T F

15 The inattention of ADHD children is not primarily a consequence of defiance, oppositionality, and an unwillingness to please others.

T F

16 ADHD is a medical disorder that can only be treated with medication.

T F

17 ADHD children could do better if they only would try harder.

T F

18 Most ADHD children outgrow their disorder and are normal as adults.

T F

19 ADHD can be inherited.

T F

20 ADHD occurs equally as often in girls as in boys.

T F

21 ADHD occurs more in minority groups than in Caucasian groups.

T F

22 If medication is prescribed, educational interventions are often unnecessary.

T F

23 If a child can get excellent grades one day and awful grades the next, then he must not be ADHD.

T F

24 Diets are usually not helpful in treating most children with ADHD.

T F

25 If a child can play Nintendo for hours, he probably isn't ADHD.

T F

26 ADHD children have a high risk for becoming delinquent as teenagers.

T F

27 ADHD children are typically better behaved on 1-to-1 interactions than in a group.

T F

28 ADHD often results from a chaotic, dysfunctional family life.

T F

SECTION C

INSTRUCTIONS: Please circle the number that corresponds with your personal viewpoint of ADHD in children.

What is your attitude towards ADHD in children?

Favourable 7 6 5 4 3 2 1 Unfavourable

Appendix E: Letter from Education Department of Western Australia
**WESTERN
AUSTRALIA**

 151 ROYAL STREET
 EAST PERTH WA 6004
 TELEPHONE (08) 9264 4111
 FACSIMILE (08) 9264 5005
 TTY (08) 9264 4641

Your Ref.

Our Ref.

DO00/012924

Enquiries

Branch

Ms Bruna Bekle

6050

Dear Ms Bekle

Thank you for your letter dated 27 June 2000 requesting approval to conduct research in Western Australian government schools relating to teacher knowledge and attitudes about Attention-Deficit Hyperactivity Disorder.

In accordance with the Education Department's Policy on Research in Government Schools participation in surveys is a matter for the discretion of school principals and individual teachers. Your research abstract presents as a very worthwhile area of enquiry and I would encourage teachers to participate.

Responsibility for the quality control of the research, with particular regard to ethics and methodology, resides with the university at which you are enrolled.

Please contact Alan Dodson [REDACTED] for any further advice or assistance you may require, including school sample selection.

I would appreciate receiving a copy of your findings and I wish you every success with your research.

Yours sincerely,

 [REDACTED]
PETER BROWNE
A/DIRECTOR-GENERAL

2000 JUN 27

Appendix F: Consent Document

Please read the following statements and tick the relevant box (✓) if you agree, before you proceed any further	✓
I have read the Information Sheet	
I was given an adequate opportunity to ask questions	
The questions I asked were answered to my satisfaction	
I understand the content of the information sheet	
I understand the implications of this study	
I understand that I am not obliged to participate in this study	
I understand that I can refuse to answer questions, or can at any time stop answering this questionnaire and withdraw from this study	
I realize that there will be no penalty should I decide not to participate or stop participating	
I confirm that I voluntarily chose to complete this questionnaire	
Thank you, if you have ticked each of these boxes you can proceed completing the questionnaire. To ensure the anonymity of the study I will prefer that you do not write your name, or any comments, that will make you identifiable, on it.	

Appendix G: Answer Code for True/False Questions

	Questions	Answer Code
9	ADHD can be caused by poor parenting practices.	False
10	ADHD can often be caused by sugar or food additives.	False
11	ADHD children are born with biological vulnerabilities toward inattention and poor self-control.	True
12	A child can be appropriately labelled as ADHD and not necessarily present as over-active	True
13	ADHD children always need a quiet, sterile environment in order to concentrate on tasks	False
14	ADHD children misbehave primarily because they don't want to follow rules and complete assignments.	False
15	The inattention of ADHD children is not primarily a consequence of defiance, oppositionality, and an unwillingness to please others.	True
16	ADHD is a medical disorder that can only be treated with medication.	False
17	ADHD children could do better if they only would try harder.	False
18	Most ADHD children outgrow their disorder and are normal as adults.	False
19	ADHD can be inherited.	True
20	ADHD occurs equally as often in girls as in boys.	False
21	ADHD occurs more in minority groups than in Caucasian groups.	False
22	If medication is prescribed, educational interventions are often unnecessary.	False
23	If a child can get excellent grades one day and awful grades the next, then he must not be ADHD	False
24	Diets are usually not helpful in treating most children with ADHD	True
25	If a child can play Nintendo for hours, he probably isn't ADHD.	False
26	ADHD children have a high risk for becoming delinquent as teenagers.	True
27	ADHD children are typically better behaved on 1-to-1 interactions than in a group.	True
28	ADHD often results from a chaotic, dysfunctional family life.	False