PRIMARY SCHOOL TEACHERS' KNOWLEDGE AND MISPERCEPTIONS OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER (ADHD)

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ABSTRACT

Attention-Deficit/Hyperactivity Disorder (ADHD) is a serious disorder that affects approximately 5% of South African children. Teachers are seen as one of the most valuable sources of information with regard to referral and diagnosis of ADHD. They also have the responsibility for creating an environment conducive to academic, social and emotional success for children with ADHD. However, since there is some doubt as to whether teachers have the appropriate knowledge of ADHD to fulfil this important role, this study aimed at assessing the knowledge and misperceptions of ADHD of primary school teachers in towns on the periphery of the Cape Town Metropole. An empirical study was done using a measuring scale that was previously used in a similar study in six New York public schools. This scale, KADDS (Knowledge of Attention Deficit Disorders Scale), measures teachers' knowledge and misperceptions in three specific areas: symptoms/diagnosis of ADHD, general knowledge about the nature, causes and outcome of ADHD and possible interventions (treatment) with regard to ADHD. A demographic questionnaire was administered along with the KADDS to 824 teachers at 35 selected schools. The response rate was 67% (552/824). The data were statistically analysed, using Statistica Version 6.1.409. The overall knowledge of ADHD was poor (42,6% on KADDS). The results suggest that teachers are most knowledgeable about symptoms/diagnosis, scoring lower on treatment and general knowledge subscales.

Correlation tests were done to identify possible relationships between teachers' knowledge of ADHD and their demographic characteristics. These reveal that overall knowledge of ADHD is significantly related to teachers' sense of self-efficacy and to their exposure to ADHD as a childhood disorder (e.g. teaching a child with ADHD, attending workshops on ADHD, extra reading about this disorder, assessment of medication and the number of hours allocated to ADHD in their initial training as a teacher). It is recommended that in-service and pre-service teachers are given courses on ADHD, as well as in behavioural management and academic interventions (curriculum adaptations) for children with ADHD. This training should be supplemented with ongoing support.

Samevatting

Aandagtekort/hiperaktiwiteitsteuring (ADHD) is 'n ernstige versteuring wat ongeveer 5% van Suid-Afrikaanse kinders se lewens raak. Onderwysers word beskou as een van die waardevolste bronne van inligting by die verwysing en diagnosering van leerders met ADHD. Onderwysers het ook 'n verantwoordelikheid om 'n omgewing te kan skep wat bevorderlik is vir akademiese, sosiale en emosionele sukses vir 'n leerder met ADHD. Weens die onsekerheid wat heers oor laerskool-onderwysers in die Wes-Kaap se toepaslike kennis van ADHD om hierdie belangrike rol te kan vervul, was die hoofdoel van hierdie studie om die kennis en wanopvattings omtrent hierdie versteuring onder onderwysers op die rand van die Kaapse Metropool te assesseer. 'n Empiriese studie is gedoen en 'n meetinstrument is gebruik wat tevore in ses openbare skole in New York in 'n soortgelyke studie gebruik is. Hierdie meetinstrument, KADDS (Knowledge of Attention Deficit Disorders Scale), meet onderwysers se kennis en wanopvattings in drie spesifieke areas: simptome/diagnose, algemene kennis oor die aard, oorsake en uitkomstes en moontlike intervensies (ondersteuning) met betrekking tot ADHD. 'n Demografiese vraelys is saam met die KADDS uitgedeel aan 824 onderwysers by 35 skole. Die terugvoerrespons was 67% (552/824). Die data is statisties geanaliseer deur gebruik te maak van Statistica Version 6.1.409. Die algehele kennispeil van Aandagtekort/hiperaktiwiteitsteuring in terme van KADDS was laag (42,6%). Die resultate het getoon dat onderwysers die meeste kennis het in terme van die simptome/diagnose van ADHD, terwyl laer tellings in die algemene kennis en behandeling subskale behaal is.

Korrelasietoetse is gedoen om moontlike verbande tussen onderwysers se kennis van ADHD en hul demografiese eienskappe te bepaal. 'n Statisties betekenisvolle verband tussen die algehele kennis van ADHD en onderwysers se effektiwiteit en hul blootstelling aan hierdie versteuring (byvoorbeeld om 'n leerder met ADHD te onderrig, om werkwinkels oor ADHD by te woon, ekstra leeswerk oor hierdie versteuring, betrokkenheid by die assessering van medikasie en die getal ure wat bestee is aan ADHD tydens die aanvanklike opleiding van die onderwyser). Daar is aanbeveel dat huidige onderwysers, sowel as onderwysstudente opgelei word in ADHD, asook ook in gedragsmodifikasie en akademiese intervensies (aanpassing van die kurrikulum) vir kinders met ADHD. Hierdie opleiding behoort opgevolg te word met volgehoue ondersteuning.

DECLARATION

I, the undersigned, hereby declare that the work contained in this thesis is my own original work and that I have not previously, in its entirety or in part, submitted it at at any university for a degree.

_____
Signature

_____
Date

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter 1

ACTUALITY, PROBLEM STATEMENT AND OBJECTIVES

1.1 INTRODUCTION

> *It would seem Adeimantus,*
> *That the direction in which education starts a man,*
> *Will determine his future life.*
>
> —From *The Republic, IV* by Plato, 429-347 BC
>
> (Weis & Hechtman, 1993: 35)

Every day, five days a week, children spend most of their time in classrooms and other school settings. Here they are expected to follow rules, behave in socially appropriate ways, participate in academic activities and not disrupt the learning process or activities of others. Teachers have to see that the skills and knowledge that form part of the curriculum become part of the learners' own competence, and teach the learners to behave in a manner that meets organizational, cultural and social expectations. The work of the teacher becomes much more demanding when some learners have Attention-Deficit/Hyperactivity Disorder (ADHD), as their problems with attention span, impulse control and activity level frequently interfere with activities in the classroom and socially (DuPaul & Stoner, 2003:39).

ADHD is the most recent diagnostic label used to describe people who have significant problems with attention, hyperactivity, and impulsivity – the most commonly diagnosed psychiatric children's disorder (NIH Consensus Statement, 1998, American Psychiatric Association, 2000). Epidemiological studies indicate that between 3% and 7% of children in the United States can be diagnosed with ADHD (Barkley, 1998b:81). This serious disorder affects approximately 5% of South African children and is, according to preliminary research, the most prevalent psychiatric disorder among children in South Africa as well (Meyer, 1998:94). It is quite safe to assume that there will be at least one child with ADHD in every classroom in every school.

Most children suspected of having ADHD are referred for assessment in the first three grades of schooling, because children are asked at this point to engage in activities that run counter to the core characteristics of the disorder such as paying attention, following instructions and staying seated (Weiss & Hechtman, 1993:35; Barkley; 1998a:191).

In the absence of independently validated tests for ADHD, teacher referrals have become a significant factor in determining whether a child is diagnosed with the disorder. A teacher who informs parents that the child should be evaluated for ADHD, is likely to rate the child high on characteristics associated with the disorder.

1.2 DEFINITION OF CONCEPTS

In order for the reader to gain optimum benefit from the research process, the following concepts will be explained:

1.2.1 Attention-deficit/Hyperactivity Disorder (ADHD)

ADHD is a disorder that is characterised by a persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequently displayed and more severe than is typically seen in individuals at a comparable level of development (American Psychiatric Association, 2000:85).

1.2.2 Knowledge

The Oxford English Dictionary (2002) gives three definitions of knowledge. The first meaning given is “information and skills gained through experience or education”. The second meaning given is “the sum of what is known” and the third meaning given “awareness gained by experience of a fact or situation”. The term “knowledge” as used in this study adopts the first meaning given by the Oxford English Dictionary. Having knowledge of ADHD thus implies having information and skills that are the product of experience and/or education. In turn, having adequate knowledge would imply having adequate information and skills about Attention-Deficit/Hyperactivity Disorder. Many teachers are familiar with ADHD, especially with the primary symptoms of ADHD. They know, for instance that children with ADHD are fidgety. They often base their reasons

for referral on primary symptoms. The problem with this is that several of these primary symptoms have poor positive predictive power (Sciutto, Terjesen & Bender Frank, 2000:116). Familiarity with this disorder, therefore, cannot be seen as adequate knowledge of this disorder.

Many studies have shown that ADHD training is not part of teachers' initial training (e.g. Jerome, Gordon & Hustler, 1994:563; Holz & Lessing, 2002:103). Generally, therefore, teachers gain their knowledge of ADHD through the experience of teaching children who have been diagnosed as having ADHD.

1.2.3 Misperceptions

Perceptions are described in the Oxford English Dictionary (2002) as "a way of understanding or regarding something". Previous studies have indicated that teachers have several incorrect specific perceptions of ADHD. In this study the term "misperceptions" is used to show that a particular teacher's belief or a specific point of view regarding a particular aspect of ADHD is **incorrect**.

1.2.4 Primary school teachers

Teachers who are involved in the education of children between the ages of 6 and 13 years of age.

1.3 CONTRIBUTION AND ACTUALITY OF THE INVESTIGATION

Attention-Deficit/Hyperactivity Disorder can have far-reaching effects on the lives of the people who experience problems as a result of it. Children with ADHD often have serious impairments in many areas of functioning, including academic achievement and relationships with peers. ADHD is also highly comorbid (coexisting) with the other disruptive behaviour disorders, conduct disorder and oppositional defiant disorder.

The seriousness of ADHD is highlighted by the core symptoms of this disorder (inattention, impulsivity, hyperactivity), its accompanying associated characteristics (cognitive deficits, speech and language impairments, interpersonal difficulties and task

and situational problems) and the comorbid disorders which often predict the development of even more serious problems and a poor outcome in adolescence and adulthood (Hinshaw, 1994 in Pelham *et al*., 1998:190; Mash & Wolfe, 2002:106).

Numerous research studies have been done in the area of ADHD, and especially during the last eight years the growth in research has been astounding. Much of this research has been concerned with assessment ;e.g. Carey, 1999; Angello, Volpe, DiPerna, Gureasko-Moore, 2003; Hartnett, Nelson & Rinn, 2004), treatment (e.g., Moline & Frankenberger, 2001; Miranda, Presentacion & Soriano, 2002; Fabiano & Pelham, 2003) and the etiology of this disorder (e.g. Barkley, 1998a). There is also a vast amount of literature on comorbid disorders (e.g. Biederman, Faraone, Mick, Moore & Lelon, 1996; Jensen, Martin & Cantwell, 1997). The research in the field of education has tended to focus on the academic and social difficulties learners with ADHD experience in the classroom (e.g., DuPaul & Eckert, 1997; Pfiffner & Barkley in Barkley, 1998a).

Few studies have examined teachers' knowledge and perceptions of ADHD. This is surprising, considering that teachers are seen as one of the most valuable sources of information with regard to diagnosis because of their daily contact with children in a variety of clinical relevant situations (Pelham & Evans, 1992:288). Teachers are usually the ones who refer children for ADHD assessment, thus playing a very important part in the screening for ADHD (Snider, Busch & Arrowood, 2003:47; Lawson, 2004:25). These referrals have often been used as a predictor of a child's symptoms (Pelham & Evans, 1992:288). Furthermore, the diagnostic criteria in the Diagnostic and Statistical Manual for Mental Disorders (APA, 2000:85) require that the hyperactive-impulsive or inattentive symptoms should be present in two or more settings (e.g., at school and at home). This requirement emphasizes the prominence of teacher information in making the diagnosis (Wolraich, Lambert, Baumgaertel, Garcia-Tornel, Feurer, Bickman & Doffing, 2003:446). The psychologist/medical practitioner needs detailed information from schools to help them to make a diagnosis. The goal of diagnosis is not just the diagnosis itself, but also, based upon the information gathered, to plan interventions that are likely to succeed (DuPaul & Stoner, 2003:65). A study done on 401 primary care pediatricians found that more than half of them relied only on school reports in arriving at their diagnosis of ADHD (Carey, 1999:665).

The knowledge teachers have about ADHD may influence how they communicate with and teach children with ADHD. Consequently, if teachers have more accurate knowledge of this disorder, they may have a better understanding of learners with ADHD and this may prevent them from developing negative views of these learners or labelling them (Holz & Lessing, 2002:105). Furthermore, it is vital for teachers to have adequate and appropriate knowledge about the symptoms/diagnosis, etiology and course of ADHD so they can offer effective advice. Studies have found that teachers provide inaccurate and inappropriate advice to parents of children with ADHD and that parents frequently follow that advice (DiBatista & Shepherd, 1993 in Kos, Richdale & Jackson, 2004:518). According to Piffner and Barkley (1998) teachers have a poor grasp of the nature, course, causes and outcomes of ADHD, and they tend to have substantial misperceptions about appropriate interventions for the children with ADHD.

Based on findings in the literature, “treatment of choice” for ADHD is psychostimulant medication and behaviour modification procedures (Pelham, Wheeler & Chronis, 1998:414; DuPaul & Eckert, 1997a:24; Pelham & Gnagy, 1999:225; Kollins, Barkley & DuPaul, 2001:41). It has been found that the use of stimulant drugs in ADHD promotes attentiveness and appropriate interpersonal interactions with teachers, parents, and peers. Teachers may be inclined to rely on medication as the only form of treatment if the child responds positively to the medication. This runs counter to the findings in studies that behavioural improvement is sustained after interventions are withdrawn, whereas medication effects stop (Stern, Garg & Stern, 2002:1000). Various studies have shown that stimulant medication has very little effect on academic performance. As Pelham and Gnagy (1999:226) point out,” Simply medicating children, without teaching them the skills they need to improve their behaviour and performance, is not likely to improve the children’s long-term prognosis.” Knowledge of this disorder is vitally important to implement effective interventions. The classroom can be seen as an important and appropriate setting where the personal, social and academic development of children with ADHD can be supported by interventions implemented by teachers. The effectiveness of these interventions at school relies heavily on the teachers (Miranda *et al*., 2002:546, 558).

In previous studies that investigated teachers’ knowledge of ADHD (Jerome *et al*. 1994; Sciutto *et al*., 2000; Kos *et al*., 2004), it was found that teachers receive very little if any

training in ADHD and related matters. It is also true that many myths surround ADHD and appropriate interventions. A serious issue is that wrong information about ADHD can lead to underdiagnosis (Consortium of International Scientists, 2002), overdiagnosis (Sciutto *et al*., 2000:115,116) of ADHD and to ineffective interventions of children with ADHD (DuPaul & Eckert, 1997b:370).

In the light of the seriousness of this disorder and the amount of time that the child spends at school, it is important to assess the accuracy of teachers' knowledge of ADHD and the possible misperceptions they harbour in order to help and support children with ADHD in the best possible way.

1.4 STATEMENT OF THE PROBLEM

Inclusive education is becoming a reality in South Africa (Department of Education, 2001). Teachers have to cope with more learners in their classes and with more learners with diverse needs, such as those who have ADHD. Although studies have been undertaken in Canada (1994), USA (2000) and in Australia (2004), there has not yet been a study that provides data regarding teachers' knowledge and misperceptions of ADHD in South Africa. In view of the possible support for teacher and the benefits for learners, it seemed imperative that a study be done in South Africa, which would compare its findings with the findings of the studies done in the previously mentioned countries. In this way the generalisability of the research results could be strengthened and the consequent interventions effected in other countries could be taken into account when making recommendations for South Africa.

1.5 RESEARCH METHODOLOGY

This study was done in 35 primary schools in the periphery of the Cape Town Metropole. The KADDS questionnaire was used to collect quantitative data to be analysed statistically to address the research questions. A survey was undertaken to collect original data from a large population too large to observe directly and make descriptive assertions about. Purposive samples were drawn from the different regions with sample content reflecting the population of the region. Permission was obtained

from the Western Cape Education Department, as well as the headmasters of the selected schools to conduct the study (see Addendum C and Addendum D).

1.6 RESEARCH INSTRUMENT

The instrument selected was the Knowledge of Attention Deficit Disorders Scale (KADDS). This scale was developed by Sciutto *et al*., 2000 and previously used in a similar study conducted in 6 New York area public schools. The scale chosen was used in part in a similar study conducted in Australia (Kos *et al*. 2004). A demographic questionnaire was administered along with the KADDS. The KADDS measures teachers' knowledge and misperceptions of ADHD in three specific areas: symptoms/ diagnosis of ADHD, general knowledge about the nature, causes and outcome of ADHD and possible interventions with regard to ADHD.

Permission was obtained from Sciutto (2000) for this instrument to be used in the present study (see Addendum B).

1.7 STATEMENT OF OBJECTIVES

The central objective of the study was to assess teachers' knowledge and misperceptions of ADHD by means of the KADDS scale based on responses to 41 questions in a questionnaire distributed among teachers in 35 primary schools in the periphery of the Cape Town Metropole. *Correct*, *don't know*, and *incorrect* responses to the questions indicated respectively knowledge, a lack of knowledge and misperceptions with regard to ADHD.

The following research questions and hypotheses were formulated:

Question 1:
What knowledge and misperceptions with regard to ADHD do teachers have?

Hypothesis 1:
The sum of the scores for the *don't know* and *incorrect* responses will exceed the score for the *correct* responses

Hypothesis 2:

Teachers' scores on the symptoms/diagnosis subscale for *correct* responses will be lower than the combined score for *don't know* and *incorrect* responses.

Hypothesis 3:

Teachers' scores on the general knowledge subscale for *correct* responses will be lower than the combined score for *don't know* and *incorrect* responses.

Hypothesis 4:

Teachers' scores on the treatment subscale for *correct* responses will be lower than the combined score for *don't know* and *incorrec*t responses.

Question 2:

Where, in terms of the subscales, does the greatest lack of knowledge exist?

Hypothesis 5:

There will be significant differences between the mean percentages for *correct* responses on the symptoms/diagnosis subscale, the general knowledge subscale and the treatment subscale.

Hypothesis 6:

There will be significant differences between the mean percentages for *don't know* responses on the symptoms/diagnosis subscale, the general knowledge subscale and the treatment subscale.

Hypothesis 7:

There will be significant differences between the mean percentages for *incorrect* responses on the symptoms diagnosis subscale, the general knowledge subscale and the treatment subscale.

Question 3:

Which, if any of the selected demographic characteristics correlate statistically with the total KADDS score?

1.8 PROGRAMME OF STUDY

Chapter 2 consists of an overview of the literature concerning what ADHD is: the history of ADHD, controversies surrounding this disorder, the etiologies, diagnostic criteria, comorbid disorders, associated problems, subtyping and social relations. ADHD in the schools, assessment of ADHD and the treatment of this disorder will also be discussed. In Chapter 3 a brief discussion of the nature of research is followed by a discussion of the research methods used in this study. In Chapter 4 the findings of the study will be presented and discussed. Chapter 5 comprises conclusions based on the findings of this study and their implications, limitations of the study and recommendations for further research.

Chapter 2

LITERATURE REVIEW

2.1 INTRODUCTION

According to the White Paper 6 (Department of Education, 2001) inclusive education in South Africa has become a reality, placing demands on teachers to educate learners with diverse needs within mainstream classrooms. Inclusion emphasizes, "……the need to reconsider and reform school curricula in order to cater for all learners, rather than focusing on how a learner with a disability or another special educational need, will need to adapt to fit into the regular class" (Engelbrecht, 2000:2). Teachers now have to operate in new ways which involve restructuring their classrooms and the curricula in order to include all learners whatever their specific needs, including learners with ADHD.

In the light of the prevalence of ADHD, as well as the responsibility they have to include all learners with diverse needs in their classrooms, it is imperative that teachers should have a sound background of the nature of ADHD, as well as knowledge of this disorder to be able to make appropriate referrals, to be involved in the interventions in a multi-disciplinary context and to be able to restructure their classrooms to accommodate the needs of learners with ADHD. The aim of this chapter is to identify from the literature review aspects relevant to the management of ADHD in education.

The literature on the history of ADHD highlights the continuous change in this field, as well as the complexity of ADHD. It also highlights the controversies and many myths about this disorder. In an attempt to address these controversies and myths two prominent consensus documents were recently issued. Section 2.2 contains a discussion of the consensus documents, as well as definitions of ADHD, general information on the prevalence and outcome, causes of ADHD, associated problems and comorbid disorders. In Section 2.3 insights obtained from the literature on the primary symptoms, diagnostic criteria and assessment will be presented. It is of utmost importance that the teacher who is most often the first to make a referral be aware of

how a diagnosis is made and what relevant information the psychologist/medical practitioner needs in order to make a diagnosis. Possible interventions/treatment to support children with ADHD will be discussed in 2.4 and recent research on teachers' knowledge of ADHD will be outlined and discussed in Section 2.5. The conclusion to the chapter provides an overview of the main findings of the review of the literature.

2.2 GENERAL INFORMATION ON ADHD

2.2.1 Development of the concept of ADHD

In order to understand current views on ADHD the history of ADHD over the last hundred years needs to be reviewed (Mash & Wolfe, 2002:100). Various biomedical and psychosocial explanations and various labels have been used during that time to explain the behaviours that are typical of ADHD. When compulsory education was introduced in the USA at the turn of the previous century, with the demands that it placed on children to be self-controlled in a group, it became apparent that there were many children with ADHD symptoms. George Still was the first doctor to describe the hyperactive symptoms as a disorder arising out of "inhibitory volition" and "defective moral control" (Barkley, 1998a:5).

During the next few decades scientists concentrated more on possible causes of this disorder. The labels "minimal brain damage", "minimal brain dysfunction" and "brain-injured child syndrome" show that they thought this disorder had a physical cause. This brain damage theory was rejected since it could not explain the vast majority of cases. In the late 1950s some researchers called it "hyperkinetic impulse disorder" because of the poor filtering of stimulation that allowed an excess of stimulation to reach the brain. As a result of a better description of behavioural problems, this view was gradually replaced during the 1960s and the term "hyperactive child syndrome" came to be used. Hyperactivity was then seen as the core problem of ADHD. In the 1970s this view broadened to include problems in attention and impulse control as primary characteristics of this disorder (Barkley, 1998a:7-9; Mash & Wolfe, 2002:100). The name of the disorder then became ADD (attention deficit disorder, with or without hyperactivity).

Advanced research hereafter made it clear that impulsiveness and hyperactivity that were seen in children with ADD with hyperactivity were highly related to each other, and that they form a “single problem of poor inhibitory control” (Barkley, 2000:33). Limited inhibitory control was seen as important as the problems related to attention in differentiating ADHD from other childhood disorders and led to the current name Attention-Deficit/Hyperactivity Disorder (Barkley, 2000: 33).

Over the years there have been many different views on ADHD. On the one hand, there are people who base their views on scientific findings. On the other hand, many believe ADHD is a myth, fraud or benign disorder. Recently two prominent Consensus Documents were issued to address these controversies. In 1998 the National Institute of Health (NIH) issued their Consensus Statement addressed to the clinical practice and biomedical research communities to verify that ADHD is an established condition, and to provide information on the impact of ADHD and the best practices concerning the effective diagnosis and management of ADHD (National Institute of Health, 1998). In January 2002 a consortium of 84 leading international scientists issued an international Consensus Statement on ADHD in which they addressed the press (Consortium of International Scientists, 2002). Their concern was the periodic inaccurate portrayal of ADHD that could cause thousands of people experiencing problems not to seek treatment for their disorder. The aim was to give accurate scientific information on an established condition and the harmful impact it has on the lives of the people living with this disorder.

ADHD is recognized by the major medical organizations (e.g., American Psychiatric Association, U.S. Surgeon General, the American Medical Association, the American Academy of Child and Adolescent Psychiatry, the American Psychological Association) as a genuine disorder, because of the overwhelming scientific evidence of this disorder. They subscribe to the view, based on hundreds of scientific studies, that the central problem of this disorder is a deficit in sustained attention and in behavioural inhibition, in addition to the strong neurological and genetic component in ADHD. This disorder needs to be managed with a combined approach of medication and psychosocial therapy, because of the seriousness and pervasiveness of the problems.

Until recently ADHD was seen as a transient disorder. Research has changed this view to one of a “lifelong, chronic neurobehavioral disorder” (Accardo, Blondis, Whitman & Stein, 2000:119).

This history of change, reflected in the different names, causes and treatment of ADHD, underline the need to keep abreast of the latest research findings in order to address this disorder effectively.

2.2.2 Definition of ADHD

ADHD describes children who persistently display age-inappropriate symptoms of inattention and hyperactivity-impulsivity (American Psychiatric Association, 2000:85). Most clinicians believe that three primary problems are at the heart of ADHD which make it difficult for a child with ADHD to control his/her behaviour problems related to sustained attention, impulse control or inhibition and excessive activity. Many clinical scientists from various countries now also hold the view that there are two additional problems at the heart of ADHD, namely difficulties following rules and instructions and excessive variability or inconsistency in responses to situations (Barkley, 1998a:73; Accardo *et al*., 2000:11). All of these symptoms could be associated with the central problem for most of the children with ADHD – a deficit in inhibiting behaviour (Barkley, 2000:34).

2.2.3 Prevalence and outcome

2.2.3.1 Prevalence

ADHD influences millions of children around the world. In every country and culture where ADHD was studied the existence of this disorder was identified (Barkley, 1998b:67). Approximately 3% to 5% of elementary school children in the United States have been diagnosed with this disorder (American Psychiatric Association, 2000:90). In the United Kingdom the consensus of expert opinion puts the prevalence of ADHD in the childhood population at 5% (National Institute for Clinical Excellence, 2000 in Chu, 2003:254).

Studies that have investigated the prevalence of this disorder in South Africa showed similar results: approximately 4% to 5% per cent of primary school children show significant ADHD symptomatology (Bräuer, 1991:36; Meyer A, 1998:186). With South Africa now moving towards inclusive education and with a greater number of learners in every class, it is likely that there is more than one learner with ADHD in every classroom.

Boys are more frequently referred and diagnosed than girls, with estimates ranging from 6% to 9% for boys and 2% to 3% for girls in the primary schools. In adolescence these rates for boys drop, but there are still more boys than girls diagnosed (Mash & Wolfe, 2002:111).

There seems to be a possibility that ADHD is diagnosed more often than the prevalence rate indicates. Recent studies suggest a higher prevalence rate (Wolraich *et al*., 1997 in Meyer, 1998:187). Other evidence supporting this conjecture is that ADHD is the most common reason why children are referred to psychologists/medical practitioners (Biederman *et al*., 1990 in HaileMariam, Bradley-Johnson & Johnson, 2002:94), there has been a sharp rise in the prescription of stimulant medication (Coles, 2000:6; Moline & Frankenberger, 2001:569) and frequent misdiagnosis, because the behaviour that the child exhibited was not ADHD, but caused by or related to some other condition (Hartnett, Nelson & Rinn, 2004:74).

2.2.3.2 Outcome

Attention-Deficit/Hyperactivity Disorder is present from a very young age, continuing through childhood and adolescence and often into adulthood. Most children are referred for assessment in the first three years of schooling (Weis & Hechtman, 1993:35). Various longitudinal studies have shown that this childhood disorder carries a high risk of having a long-term outcome (Barkley, 1998a: 217). These studies suggest three main outcomes in adolescence. First, a small group of children do not exhibit significant symptoms when they reach adolescence. Second, the majority of children, 70% to 80% with ADHD do not “outgrow” their difficulties when reaching adolescence (Weiss & Hechtman, 1993; Barkley, 1998a:192). These adolescents show an improvement in behaviour control with their maturation, but they still exhibit significant problems with inattention and impulsivity which negatively influence their functioning at school, affect

their self esteem and the developmental tasks of adolescence. The third group develop severe antisocial behaviour problems and/or substance abuse, in addition to ADHD, by adolescence (Robin, 1998:46).

Results of various studies suggest that over 50% of children with ADHD will continue to show symptoms of inattention and impulsivity into young adulthood (Barkley, 1998a:201). For many children ADHD is a lifelong disorder. When looking at the long-term risk for a large percentage of children with ADHD, it is clear that teachers will have to play an important part in creating environments at school conducive to the academic, social and emotional success of ADHD learners (DuPaul & Stoner, 2003:20).

2.2.4 Possible causes of ADHD

No direct and immediate cause of ADHD is known yet. Considerable research has been done on various causal factors for this disorder. Numerous causes may lead to ADHD, but mounting evidence points to within child variables, such as neurological and genetic factors as the greatest contributors to this disorder (Barkley, 1998a:64). Studies that have been done with families and twins provide very strong support for a genetic component in the cause of ADHD (Accardo *et al*., 2000:28). The Consortium of International Scientists (2002:97) reported that one gene has so far been positively associated with ADHD. They also stated that the genetic contribution to the ADHD characteristics is found to be among the highest for any psychiatric disorder (70-95%). The fact that ADHD is a strongly familial disorder (higher incidence of ADHD among first degree biological relatives) makes it highly possible that when a child is diagnosed with ADHD either one or both of his parents could have or had ADHD. This fact has implications for the teacher in communicating with the parents, having a deeper understanding of the child and perhaps being more realistic about guidelines given to parents to help with structure and homework.

Neurological imaging studies done over the last ten years have suggested that the prefrontal cortex, part of the cerebellum and the basal ganglia may be involved in the symptoms that children with ADHD experience (Barkley, 1998b:67). These areas of the brain are associated with attention, executive function, delayed responding, and response organization. In children with ADHD, there seems to be less activity or

structural difference in these areas of the brain which could then cause symptoms like inattention and problems with inhibition (Barkley, 2000:70, Mash & Wolfe, 2002:119). Other evidence that could strengthen the argument that ADHD has a neurobiological cause, is that the use of stimulant medication effectively addresses symptoms of inattention, impulsivity and hyperactivity, suggesting that neurotransmitters may be involved, although no conclusions can be made on the effect of medication alone (Accardo *et al*., 2000:72; Mash & Wolfe, 2002:119).

There is very little scientific support for social and environmental factors as causes of ADHD. However, it could be that such factors could lead to a greater severity of the symptoms, contribute to its persistence (Mash & Wolfe, 2002:119), and very likely, "contribute to the forms of comorbid disorders associated with ADHD" (Barkley, 1998a:177).

Although there are numerous ongoing research studies into the cause or causes of ADHD one must keep the following in mind, "the presence of an organic cause for attentional deficits says nothing in itself about their treatment or outcome; that is, treatments such as behavioural interventions and classroom strategies will remain the same, and a positive outcome is neither precluded nor reduced by the identification of a specific medical cause" (Accardo *et al*., 2000:10).

2.2.5 Associated problems

In addition to their primary problems, children with ADHD may experience a variety of other difficulties which could be more severe than the core problems of ADHD (DuPaul & Stoner, 2003:5). The difficulties that are commonly associated with ADHD include cognitive deficits, speech and language impairments, interpersonal difficulties and task and situational factors (Mash & Wolfe, 2002:106). These difficulties will be discussed in sections 2.2.5.1 to 2.2.5.4.

2.2.5.1 Cognitive deficits

Numerous studies have shown that most children with ADHD are of normal overall intelligence or brighter, yet they experience difficulty in applying their intelligence to

everyday situations (Mash & Wolfe, 2002:106). Almost all the children that are referred for ADHD are underperforming at school due to their ADHD related symptoms. It is also more likely that children with ADHD will have learning disabilities (a significant discrepancy between intelligence and academic achievement, such as reading, mathematics, spelling or language) that can result in poor academic performance (work productivity in the classroom) and academic achievement (Barkley, 1998a:99; Mash & Wolfe, 2002:111).

2.2.5.2 Speech and language impairments

Among the children with ADHD, 30% to 60% have speech and language problems that manifest in talking more and louder than normal children, shifting often in conversations, interrupting other people's conversation and starting a conversation inappropriately (Mash & Wolfe, 2002:107). When a task demands that the child organize and gather information and give it back orally, (s)he is normally less talkative and more inclined to use pauses and misarticulations. This could suggest that the child perhaps has more problems with executive processing than with speech and language (Barkley, 1998a:102).

2.2.5.3 Interpersonal difficulties

Children with ADHD experience numerous interpersonal problems with family members, teachers and peers. Their behaviour is often unpredictable, hostile, argumentative and it seems they do not learn from their past mistakes (Mash & Wolfe, 2002:108). Families with children with ADHD report having many difficulties like negative interactions and sibling conflict. There is often severe conflict between these children and their mothers from preschool up into adolescence (Mash & Wolfe, 2002:108). Conflict with their fathers is not as severe (Barkley, 1998a:74). Children with ADHD often have problems in initiating and maintaining friendships with their peers, because of their social insensitivity, timing of their behaviour and losing of their temper when frustrations come their way. Research has shown that there is a high rate of peer rejection for ADHD-related behaviours (DuPaul & Stoner, 2003:6,7).

Stimulant medication very often does not improve social competence and acceptance, because medication alone cannot increase social skills (Mash & Wolfe, 2002:109).

2.2.5.4 Situational and task factors

Children with ADHD show a great variability in their symptom severity and performance in different situations and across tasks (Barkley, 1998a:73; Mash & Wolfe, 2002:109). For example, a child may be able to watch his favourite TV programme for more than an hour, but is not able to attend during 20 minutes of homework. The following situational factors influence the performance of children with ADHD: complexity of the task and requirements for organization, amount and level of stimulation and immediacy or feedback of consequences (Barkley, 1997a in Mash & Wolfe, 2002:109). In low structured activities where there are few demands placed on the child, the behaviour of ADHD children will not be as noticeable as in tasks that make high demands with regard to planning, organization and executive regulation of behaviour. Here children with ADHD will perform less well than children without ADHD (Barkley, 1998a:74). Various studies suggest that highly stimulating material would most elicit higher levels of attention in children with this disorder. Boring tasks are usually handled with great difficulty (Barkley, 1998a:76, Mash & Wolfe, 2002:109). A child with ADHD needs immediate feedback (immediate reinforcement or punishment) for his actions in order to be attentive and regulate his impulsive behaviour. Therefore activities such as watching television and playing computer games which supply immediate feedback do not elicit attention problems (Martalas, 2004).

These situational fluctuations in symptom level and in performance have important implications for diagnosis and for supporting children with ADHD in the classroom (Barkley, 1998a:78).

2.2.6 Comorbid disorders

Many children diagnosed with ADHD also have a comorbid (co-occurring) psychiatric disorder. The most common comorbid disorders associated with ADHD are: Oppositional and Defiant Disorder, Conduct disorder and Anxiety and Depression (American Academy of Pediatrics, 2000; Mash & Wolfe, 2002:110). Various studies have indicated that 40% of children with ADHD and 65% of adolescence with ADHD display, significant oppositional defiant disorder symptoms making it the most commonly

comorbid condition with ADHD (Pelham & Evans, 1992:290; DuPaul & Stoner, 2003:6). Hyperactivity very often goes along with aggression and in children with ADHD it can be seen in their noncompliance with authority figures, poor temper control, argumentativeness and verbal hostility. These comorbid problems contribute further to the significant amount of stress teachers experience when working with ADHD children (DuPaul & Stoner, 2003:6).

2.3 DIAGNOSIS

> It is not the presence of these behaviors, but their intensity, their time course, and their negative impact on other areas of behavior and functioning that compel a diagnosis of attention deficit hyperactivity disorder. (Accardo *et al*., 2000: 11)

A diagnosis of ADHD is normally made by a psychologist or a medical practitioner. These professional people do not make the diagnosis on their own, they need input and information from parents and teachers. The teacher is most often the first person to make a referral for assessment for ADHD, because the structured school environment means children with problems of inattention, hyperactivity and impulsivity exhibit behaviours with which the other children and their teachers cannot cope.

At present there is not a diagnostic test for ADHD. This could be a contributing factor in misdiagnosis, underdiagnosis and overdiagnosis and possible unnecessary medication of many children (Coles, 2000:6; Accardo *et al*., 2000:11). One way to improve the quality of diagnosis substantially is good communication between schools and psychologists/medical practitioners (Stein in Coles, 2000:7). Teachers need to provide appropriate and adequate information on the symptoms and on the behaviour of the children they refer (HaileMariam *et al*., 2002:95). There are a number of effective treatment options, but before appropriate interventions can be planned, a correct diagnosis must first be made (Hartnett *et al*., 2004:76). Therefore it is important that the teacher should also provide information on the impact and severity of these symptoms and problems in the functioning of the child that is referred (Pelham & Fabiano, 2001:327).

Complicating the diagnosis are behaviours that are symptomatic of ADHD but are likely to occur in normal children during their development and may also occur as symptoms of problems other than ADHD (Brown, 2000:199; Chu, 2003:255). Many children display inattentive, impulsive and hyperactive behaviour which could have been caused by stressful life events, chronic abuse, mild seizures, middle ear infection and illnesses (Mash & Wolfe, 2002:104).

2.3.1 Primary symptoms

The core symptoms of Attention-Deficit/Hyperactivity Disorder are inattention, impulsivity and hyperactivity. The nature of each of these symptoms will now be reviewed to gain a better understanding of the specific impairments children with ADHD experience.

2.3.1.1 Inattention

Attention is a construct that has many dimensions. It can refer to arousal, selectivity, distractibility and sustained attention, among others (Barkley, 1998a:57). Children with ADHD do not have problems with their attentional capacity. They can remember the same amount of information for a short period of time as normal children. The primary deficit in ADHD is also not a problem with heightened distractibility as is often thought. These children are not distracted by everything. Research has shown that reducing stimulation could make it harder for the child to focus his attention. It does seem, however, that these children are more distractible in situations when stimuli are very striking and appealing (Milich & Lorch, 1994, in Mash & Wolfe, 2002:102; Barkley, 2000:37) and irrelevant material is embedded in the task they are working on (Mash & Wolfe, 2002:102).

The primary problem of children with ADHD seems to be their great difficulty with persistence of effort, or sustained attention. These children find it very difficult to keep attending during dull, boring, repetitive tasks such as homework and independent schoolwork (Barkley, DuPaul & McMurray, 1990, in Barkley, 1998a:57). When they are required to work on uninteresting tasks or tasks that offer minimal immediate consequences after completion, their performance gradually deteriorates (Barkley,

1998a:57, Mash & Wolfe, 2002:102). Research has shown that the child with ADHD may appear distracted and engage in other competing activities that promise immediate reinforcement (Landau, Lorch and Milich, 1992 in Barkley, 1998a:58). The emphasis here is on the immediate reinforcement. It seems that children with ADHD have problems with “deferred gratification” and understanding of this concept, could benefit these children tremendously (Barkley, 2000:38). Various studies conclude that adding stimulation to tasks and specifying reinforcements when completed makes it easier for the child with ADHD to sustain his attention while completing the task (Zentall, Fischer in Barkley, 2000:38).

2.3.1.2 Impulsivity

The second problem that children with ADHD experience is difficulty in inhibiting their behaviour or showing impulse control when the situation calls for them to do so. It is very difficult for children who are impulsive to regulate their behaviour according to the demands of the situation or teacher. Teachers often complain that these children cannot wait their turn, blurt out answers when questions are not completed or shout inappropriate comments. They find it a problem to delay gratification and resist immediate temptations (Anderson *et al*., 1994 in Mash & Wolfe, 2002:103). When one looks at their work performance, it is often seen that they take short cuts and apply the least amount of effort and time to complete tasks they find boring (Barkley, 2000:39). Impulsiveness is not just seen in their actions, but also in their thoughts. They tend to have more thoughts unrelated to the task they are busy with than other children (Barkley, 2000:41), their thoughts are more disorganized and they often exhibit hurried thinking (Mash & Wolfe, 2002:104). This behavioural and cognitive impulsivity may impact heavily on the academic work of these children.

2.3.1.3 Hyperactivity

An excessive or developmentally inappropriate level of motor or vocal activity characterizes the third primary symptom of ADHD. Children with ADHD are extremely active, but their movements are irrelevant to the task and in spite of their high energy level they do not accomplish much (Barkley, 1998a:60; Mash & Wolfe, 2002:103). Teachers and parents often describe these children along these lines: “act as if driven

by a motor", "can't sit still", "talks excessively", is "squirmy", and "often hums or makes odd noises". The findings of classroom observations of children with ADHD are that they are very often out of their seats, moving around in the classroom without permission, playing with objects that are not related to their school work, and making running commentaries on the activities of other children (Barkley, 1998a:61).

In the DSM-IV TR (American Psychiatric Association, 2000) the symptoms of hyperactivity and impulsivity are presented separately, although children who present with hyperactive behaviour usually also present with impulse behaviour and vice versa. These symptoms are viewed as a single dimension of behaviour called hyperactivity-impulsivity (American Psychiatric Association, 2000:85). A fundamental deficit in poor control and response inhibition unite hyperactivity and impulsivity (Barkley, 1997a and Quay, 1997 in Mash & Wolfe, 2002:103).

There is now substantial evidence that behavioural disinhibition or poor control and inhibition of behaviour is the hallmark symptom of ADHD (Barkley, 1998:60). Problems that children with ADHD have with sustained attention may actually be part of their problem with inhibiting responses to the environment around them (Barkley, 2000:43).

2.3.2 Diagnostic criteria

In order to make a diagnosis the developmental deviance and pervasiveness of the symptoms, the level of impairment, age of onset and ruling out of alternative explanations for the deviant behaviour has to be established. It is very important that teachers should be aware that these factors plus the symptoms associated with ADHD equals a diagnosis of ADHD.

Most professionals base their diagnosis on the guidelines of the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders, Text Revision* (APA, 2000:85). Teachers cannot be expected to know or to use these diagnostic criteria, but should bear them in mind when making an appropriate referral.

The Diagnostic Criteria for Diagnosis of ADHD from DSM-IV

A. Either (1) or (2):

(1) Six (or more) of the following symptoms of **inattention** have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Inattention

(a) Often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
(b) Oten has difficulty sustaining attention in tasks or play activities
(c) Often does not seem to listen when spoken to directly
(d) Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behaviour or failure to understand instructions)
(e) Often has difficulty organizing tasks and activities
(f) Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
(g) Often loses things necessary for tasks or activities (e.g. toys, school assignments, pencils, books, or tools)
(h) Is often easily distracted by extraneous stimuli
(i) Is often forgetful in daily activities

(2) Six (or more) of the following symptoms of **hyperactivity/ impulsivity** have persisted for at least 6 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) Often leaves seat in classroom or in other situations in which remaining seated is expected

(c) Often runs about or climbs excessively in situations in which 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) If often “on the go” or often acts as if “driven by a motor”

(f) Often talks excessively

Impulsivity

(g) Often blurts out answers before questions have been completed

(h) Often has difficulty awaiting turn

(i) Often interrupts or intrudes on others (e.g. butts into conversations)

B. Some hyperactive-impulsive behaviour or inattentive symptoms that cause impairment were present before age 7 years.

C. Some symptoms occur in two or more settings (e.g. at school [or work] and at home).

D. There is clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder, and are not better accounted for by another mental disorder (e.g. Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

2.3.3 Assessment

In this section the purpose, as well as the stages of assessment will be outlined. Thereafter the different roles of the people involved in the assessment of the child will be discussed with reference to the relevant literature.

2.3.3.1 Purpose of assessment

Attention-Deficit/Hyperactivity Disorder is a complex and challenging disorder where symptoms of ADHD may actually be manifestations of another disorder or problem (DuPaul & Stoner, 2003:35). Furthermore, ADHD often co-occurs with a psychological disorder (Mash & Wolfe, 2002:110). Therefore one of the purposes of an assessment is to determine if the child can be diagnosed with ADHD, as well as to determine the presence or absence of other childhood psychiatric disorders. This is a difficult process and requires extensive clinical knowledge of psychiatric disorders. Another purpose of the assessment is to decide on and plan the appropriate interventions that are needed to address the academic problems, social relations, psychological problems and psychiatric disorders that were identified in the course of assessment (American Academy of Pediatrics, 2000:1168).

2.3.3.2 Stages of assessment

Experts agree that the assessment of ADHD should involve various stages of information gathering from the chief role players using optimal methodology (Barkley, 1998a, American Academy of Pediatrics, 2000), although all these stages are often not followed. The stages discussed below are based on the educational decision-making model proposed by Salvia and Ysseldyke (1998 in DuPaul & Stoner, 2003:31). These stages are also applicable to the South African context.

Following a teacher's referral of a child on the grounds of ADHD-related symptoms, the first stage of assessment is to get the teacher's ratings of the behaviour. These behaviour-rating scales, which the teachers complete after the referral of the child, have proved reliable in establishing the severity of ADHD-related behaviours relative to the normative sample (DuPaul & Stoner, 2003:28). Teacher ratings play a critical role in the diagnostic process, but they form only one part of a large "clinical puzzle" and are not diagnostic in themselves (Accardo *et al*., 2000:180; Chu, 2003:255. Zolotor & Mayer, 2004:416), because these behaviour rating scales address the expressions of behaviour rather than the causes of the behaviour (Hartnett *et al*., 2004:74). If it becomes evident during this first stage (screening) that there are significant problems, then the assessment process moves into the second stage where multiple assessment

methods are used to determine the functioning of the child in various settings (DuPaul & Stoner, 2003:31).

During the second stage the psychologist/medical practitioner interviews the child, parents and the teacher/s. During the interview with the teacher the difficulties that the child experiences at school are discussed. The practitioner should review the DSM-IV TR (American Psychiatric Association, 2000) diagnostic criteria for a variety of child behaviour disorders with the teacher. During this interview the psychologist/medical practitioner also collects information on current management strategies that the teacher uses and the degree of success these have had in helping the child (Barkley, 2000:132; DuPaul & Stoner, 2003:35). Information on the child's academic performance and quality of social relations is also gathered (Barkley, 1998:277, 278). It is most likely that this professional person will visit the school to observe the child directly in order to form an unbiased opinion. In this way information about independent seat work and interactions with peers and the teachers can be gathered (Accardo *et al*., 2000:174; DuPaul & Stoner, 2003:40,41) and validity of the results of the rating scale can be provided by a correspondence between observation and rating scale results (Wolraich *et al*., 2002:446). The practitioner would also request information about academic performance and a review of the child's school records.
During the third stage of this process the results of the multi-method evaluation are interpreted, while development of a treatment/intervention plan is done during the fourth stage. The last stage of the assessment process is a periodic revision of the treatment.

2.3.3.3 People involved in assessment

Role of the psychologist/medical practitioner

The psychologist/medical practitioner has to collect a wealth of information on the functioning of the child from various role players. After collecting all the information (s)he has to rule out all other disorders that could possibly be responsible for the symptoms that the child has been referred for. The psychologist/medical practitioner has to look at the possible presence of co-morbid disorders and any other problems that the child experiences. Only then can a diagnosis be made. Barkley (1998b:139) uses the term "best possible educated guess" for diagnosis in the light of the absence of

entirely objective evaluating methods. The intervention/treatment plan will then be developed from the diagnosis and will be made in conjunction with the teachers involved. This intervention/treatment programme is assessed on a regular basis.

Role of the teacher:

Teachers play a significant role in the referral of children for assessment. Classroom teachers are of the most valuable sources of information regarding diagnosis because of their daily exposure to children in situations where the environment places strong demands on the regulatory skills of the children (Schwen *et al*., 1993 in Sciutto *et al*., 2000:115). It is important for the teacher to be aware of the purposes of assessment (as discussed earlier in Section 2.3.3.1), as well as the complex nature of ADHD when making the referral to a person who is an expert in childhood disorders. Although teachers play a very important part in the assessment process, they are not expected to make a diagnosis.

Apart from their role in referral, teachers also have an informational role to play in the assessment process (Sciutto *et al*., 2000:115). They need to give detailed information to the psychologist/medical practitioner about the referred child's academic history and performance, about the child's social relations and general every day functioning. After the implementation of interventions the teacher should regularly collect data to aid the assessment of the efficacy and limitations of the intervention/treatment programme (DuPaul &Stoner, 2003:66).

Role of the parents:

Parents play an indispensable role in the assessment of their children. The interview the psychologist/medical practitioner has with the parent serves several purposes: (1) It builds rapport with the professional person. (2) It gives the professional the parent's view of the child's problems and it narrows the focus of later stages of the assessment. (3) It shows how the child's behaviour is affecting the family. (4) It can provide necessary information about the relationship the parent has with the child, pointing to potential contributors to the child's problems (Barkley, 2000:129,130). Areas of importance in the interview with the parent are: Demographic Information, Major

parental concerns, Review of major developmental domains, School, family and treatment histories, Review of childhood psychiatric disorders and Psychosocial functioning (Barkley, 1998a:269-276).

The assessment of ADHD is a complex and serious task that requires “adequate time, knowledge of the relevant research and clinical literature as well as differential diagnosis, skillful clinical judgment in sorting out the pertinent issues and sufficient resources to obtain multiple types of information from multiple sources (parents, teacher, child) using a variety of assessment methods” (Barkley, 1998a:290).

2.4 INTERVENTION/TREATMENT

A multidisciplinary approach is used in the management of ADHD. The primary intervention is usually stimulant medication, parent management training and educational intervention (Mash & Wolfe, 2002:120). The people involved are normally the medical practitioner, the psychologist, the teacher and the parents who work together to assist individuals with ADHD in developing successful interventions aimed at facilitating the transition to a secondary, postsecondary or vocational setting. In South Africa we are moving towards inclusive classrooms, which places additional demands on teachers. The South African Schools Act (Republic of South Africa, 1996) sees parents as a central resource to the education system. The active involvement of parents in the intervention process should be emphasized. Parents should receive training in ADHD and the managing of ADHD-related behaviour. When parents are involved in the learning process of their children it leads to effective learning (Engelbrecht, P; Oswald, M; Swart, E & Eloff, I, 2003:306). In this way teachers can be supported in their task to meet the diverse needs of all their learners.

There are many myths and controversies about ADHD and its treatment. If teachers have wrong information about proper treatment it could lead to ineffective interventions and be a waste of their time and resources (DuPaul & Eckert, 1997b:370).

Extensive research related to the management of ADHD has been done. Numerous studies have clearly demonstrated that stimulant medication in combination with school-based behaviour modification interventions (including strategies to directly address the

academic difficulties) is effective in reducing the frequency of behaviour that is associated with ADHD (DuPaul & Eckert, 1997a:15). Yet, stimulant medication as a sole treatment seems to be the treatment of choice in the case of many children with ADHD. This is because it has been found to improve attentiveness and interpersonal interactions with peers, teachers and parents. Since problems relating to these behaviours interfere with learning, the medication could lead to an improvement in their productivity at school, (Miranda *et al*. 2002:547; Webb & Myrick, 2003:110). When a child positively responds to medication the teachers and parents may be inclined to see medication as the only intervention necessary (Pelham & Gnagy, 1999:226).

Many studies in the past ten years have clearly pointed out the limitations of using medication as the sole treatment. It has been shown that medication alone cannot produce long-term positive changes (Pelham *et al*., 1999), because medication does not teach children with ADHD the necessary skills to improve their performance and behaviour (Pelham & Gnagy, 1999:226; Miranda *et al*., 2002:547). In the study done by Weiss & Hechtman (1993) the long-term outcome for ADHD children treated with stimulant medication alone was the same as those receiving no treatment. The findings in other research were that 20% to 30% of children did not respond positively to stimulant medication, and about 50% of children with ADHD who used stimulant medication did not exhibit positive changes in academic performance (Rapport *et al*., 1994 in DuPaul & Eckert, 1997b:370, Jadad *et al*., 1999 in Frankenberger, Farmer, Parker & Cermak, 2001:132).

A meta-analysis on the outcome of 63 studies on the effects of school based interventions for children and adolescents with ADHD indicate that school-based interventions lead to a significant increase in appropriate behaviour in the classroom. This study (DuPaul & Eckert, 1997a:15) together with other studies also indicates that behaviour modification strategies are much more effective than cognitive or cognitive-behavioural strategies to enhance classroom behaviour (Pelham & Gnagy, 1999:226, Miranda *et al*., 2002:547). It seems thus important that the use of stimulant medication be accompanied by behaviour modification and academic strategies to improve the quality of life for the child with ADHD on the long run.

The following considerations should form the foundation of treatment of a child with ADHD (Mash & Wolfe, 2002:120):

- Interventions should be intensive, ongoing and a combination of treatments (Accardo, 2000:588).
- The child should be provided with external structure, because of the lack of internal structure and organizational skills.
- Effective interventions should be directed at the point of performance, there where the behaviour is that needs to be addressed (DuPaul & Stoner, 2003:143).
- Interventions should always take the child's level of development and the child's and family's individual strengths and needs into consideration (Waschbusch *et al*., 1998 in Mash & Wolfe, 2002:120).
- The focus of interventions should be on increasing the frequency of appropriate behaviour (e.g. academic productivity) rather than on decreasing disruptive classroom behaviour (DuPaul & Stoner, 2003:142).

Teachers need a broad knowledge of ADHD in order to be able to understand the needs of the children and where the difficult behaviour comes from (Miranda *et al*., 2002:548) and to plan effective behaviour modification strategies. Behaviour problems should be addressed educatively by creating the conditions necessary for children to learn the appropriate skills and knowledge necessary to replace problem behaviours with acceptable ones (DuPaul & Stoner, 2003:121). Understanding ADHD will also enable the teachers to change their classroom management, adapt the curriculum, to have realistic expectations and to use a variety of teaching strategies in order to create a positive learning environment (Holz & Lessing, 2002:108).

When stimulation medication forms part of the treatment teachers should be asked to give regular feedback to the medical practitioner. This information could be vital in determining the child's responsiveness to the medication and optimizing the efficacy and minimizing the side effects of the medication (MTA Cooperative Group, 1999:1081). Numerous studies have pointed out that when medication is used in combination with

behaviour intervention, the doses of medications are lower than when medication is the sole treatment of choice (Pelham & Gnagy, 1999:230; Kollins *et al*., 2001:24).

2.5 RESEARCH ON TEACHERS' KNOWLEDGE OF ADHD

Very few studies have been done on primary school teachers' overall knowledge of ADHD. No South African studies seem to have been done in the past ten years, and only one Australian study and two North American studies were identified (Jerome *et al*., 1994; Sciutto *et al*; 2000 & Kos *et al*., 2004).

These studies were conducted in New York State and Brown County Florida in America and in Southwestern Ontaria in Canada (Jerome *et al.,* 1994), in New York (Sciutto *et al.*, 2000) and in Victoria, Australia (Kos *et al*., 2004). All three empirical studies used self-report questionnaires in surveys among primary school teachers. The questionnaires addressed general knowledge about essential concepts of ADHD. Sciutto *et al*. (2000), using an original pool of items, made finer distinctions and examined teachers' knowledge in three broader areas: *symptoms/diagnosis* of ADHD, the *treatment* of ADHD, and *general knowledge* about the nature, causes and outcome of ADHD. This was done to show content areas relevant to educational interventions (Sciutto *et al*., 2000:117). The study that was done in Victoria Australia used some of the items in the questionnaire designed by Jerome *et al*. (1994), some of the items from Sciutto *et al*. (2000), and some items based on literature on ADHD (Kos *et al*., 2004:519).

In the study of Jerome *et al*. (1994) the average general knowledge about ADHD was significantly higher (77%) than in the study by Sciutto *et al* (2000) (47%) and Kos *et al*. (2004) (60%). Jerome *et al*. (1994) made use of a different methodology in their survey from the other two studies mentioned. They provided the respondents with only two response options (*true* or *false*). This meant that respondents had a 50% chance of guessing the correct answer, which could account for the higher overall score. Sciutto *et al*. (2000) and Kos *et al*. (2004) used three response options (*true*, *false* or *don't know*). They also used additional knowledge questions. By providing the *don't know* option the credibility of the *true* and *false* responses increased and made it possible to distinguish more clearly between wrong responses seen as misperceptions (choosing

true when it should be *false* and vice versa;) and a lack of knowledge (choosing the *don't know* option).

These studies showed that the teachers that participated in these studies had an average to good general knowledge of ADHD, that few teachers had any training in ADHD and that teachers' overall knowledge improved as a result of teaching a child with ADHD. The overwhelming majority of teachers indicated that they would welcome additional training in ADHD.

What was noticeable was the high degree of education of the teachers that participated in these studies. Of the teachers of the New York schools 79% had a master's degree and 21% had a bachelor's degree (Sciutto *et al*. 2000). Of the teachers in New York State and in Brown Country in Florida that participated, 47% had a master's degree, while 31% said they had done some graduate level courses (Jerome *et al*., 1994).

2.6 CONCLUSION

This chapter argues that the history of ADHD is one of change and that it is important to remain informed about the new knowledge being gained through research. Findings from the literature were presented on salient aspects of *knowledge* pertaining to ADHD (causes, nature and outcome), and *symptoms and diagnosis* and *treatment* that teachers need to have as a frame of reference in their contact with children with ADHD were presented. Since children spend a great deal of their time in school settings, meeting their needs within this setting is crucial. Since the behaviour related to ADHD is behaviour that creates problems (inattention, impulsivity, disorganization, hyper-activity and noncompliant behaviour) at school it is important for teachers to have a clear understanding of this disorder, which is for many learners is a lifelong disorder.

This overview of the literature demonstrates the seriousness of ADHD and argues that teachers lack the appropriate knowledge to be able to make correct referrals, to give salient information to aid the diagnostic process and to be involved in the treatment process in the classroom. It also reports on research done to describe the parameters of teachers' knowledge of ADHD and to identify areas for educational interventions. The empirical surveys conducted among primary school teachers in New York State,

Brown County in Florida, New York schools, Southwestern Ontario and in Victoria Australia formed the basis for the questionnaire that was used in this empirical study.

Chapter 3 describes how the survey was conducted and in Chapter 4 the results will be presented and discussed.

Chapter 3

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

In this chapter the research design and methodology of this study are discussed.

Research that is relevant and accountable can according to Mouton and Mertens (in Eloff & Ebersöhn, 2004:354) transform, empower and change individuals and their circumstances. When conducting research it is important to consider what the term *research* implies. Various definitions have been proposed. Mertens (1998:2) defines research in the following way:

> [I]t is the process of systematic inquiry that is designed to collect, analyse, interpret, and use data to understand, describe, predict, or control an educational or psychological phenomenon or to empower individuals in such contexts. The exact nature of the definition of research is influenced by the researcher's theoretical framework….

3.2 RESEARCH PARADIGM AND DESIGN

According to this definition of research (Mertens, 1998:2), it would seem that the theoretical orientation the researcher works from determines how the researcher will view the nature of research. The present study was done within a postpositivist paradigm. When a researcher works in a postpositivist paradigm s/he assumes that a reality does exist, but because of the researcher's limitations, it can only be known imperfectly. Therefore "…researchers can discover 'reality' within a certain realm of probability . They cannot 'prove' a theory, but they can make a strong case by eliminating alternative explanations" (Reichardt & Rallis, 1994 in Mertens, 1998:9). The researcher stays objective and dispassionate during this whole process (Eloff & Ebersöhn, 2004: 356).

A research design is seen as a framework or plan of how one intends to conduct the research process to solve the research problem (Babbi & Mouton, 2002:xxvi). The objective of the present study was to determine teachers' knowledge and misperceptions of ADHD empirically. A survey was done amongst teachers in primary schools in towns in the periphery of the Cape Metropole. The questionnaire that was used had been previously used in six public schools in New York.

3.3 METHODOLOGY

The present study was done within a quantitative paradigm. According to Neuman (2003:90) the aim of research determines the approach that will be chosen. In this study a survey was used. Surveys can be defined as "studies that are usually quantitative in nature and which aim to provide a broad overview of a representative sample of a large population" (Mouton, 2001:152). In this case, survey research was chosen as it is considered to be the best available method to collect original data to measure attitudes and orientations from a population too large to observe directly or to make descriptive assertions about (Babbi & Mouton, 2002:232,263). The "obvious advantage of such an approach is that responses to questionnaires or test items can be measured in a very standard way, which render them susceptible to a wide variety of statistical manipulations" (Babbi & Mouton, 2002:52).

3.3.1 SURVEY

3.3.1.1 Area where study was done

The first step was to apply for permission from the Western Cape Education Department (WCED) to conduct the research in primary schools in the periphery of the Cape Town Metropole (see Addendum C). The study to investigate teachers' knowledge and misperceptions of ADHD was done in primary schools in Strand, Somerset West, Stellenbosch, Paarl and Wellington (see Figure 3.1). These towns were selected for logistical reasons.

Figure 3.1 Map showing the location of the selected towns relative to the Cape Metropole

3.3.1.2 The study sample

A purposive sampling method was used. According to Babbi and Mouton (2002:166) purposive sampling is when "you select your sample on the basis of your knowledge of the population, its elements, and the nature of your research aims". The criteria that were used to select the sample were (a) the sample content reflecting more or less the population of the region, (2) big schools from the different regions in order to gain as much information as possible and (c) logistical reasons.

A list of all the schools in the periphery of the Cape Town Metropole was obtained from the Western Cape Education Department (WCED). Forty schools were selected of which five indicated that they were not interested in taking part in the study. Questionnaires were therefore distributed to teachers in 35 schools including teachers of all phases. Of the 824 school teachers (including the headmasters of the schools) that participated in this study, 552 teachers returned their completed questionnaires.

3.3.1.3 Demographic characteristics of sample

A demographic questionnaire was attached to the KADDS questionnaire to collect data regarding teachers' age, gender, years of teaching experience, training and their teaching roles. Respondents also had to indicate if they had ever requested an evaluation of a child whom they suspected of having ADHD, or if they ever taught a child whom they knew was diagnosed with ADHD. Participants also rated their self-confidence to teach a child with ADHD effectively, by means of a 7-point scale.

Some 79% of the respondents were females and 21% were males. The mean age of the participants was 41,19 (standard deviation (SD) = 8.61). The current educational level of the participants was as follows: 6% had a two year teaching diploma, 31% had a three year teaching diploma, 39% had a four year teaching diploma, 8% had a bachelor's degree, 10% had a bachelor's degree and teaching diploma, 5% had an honours degree and 1% had a master's degree or doctorate. Teachers in this sample reported an average of 16.65 (SD = 8.95) years of teaching experience.

With regard to ADHD, approximately 66% of the participants reported teaching a child whom they knew to be diagnosed with ADHD. In addition, 58% of the participants had at some time requested an evaluation of a child suspected of having ADHD. The majority of participants (66%) indicated that they have never been involved in assessing the effectiveness of stimulant medication for the treatment of ADHD. Table 3.1 gives a summary of the demographic characteristics of the sample.

Table 3.1: Descriptive statistics on demographic characteristics of sample

Variable	Valid number*	Mean	Median	Minimum	Maximum	Std Dev
Age	530	41.19	42	21	65	8.61
Years teaching	540	16.65	16	0	43	8.95
Educational level	544	3.05	3	1	8	1.32
Hours ADHD training	486	1.59	0	0	13	3.31
Number ADHD evaluations requested	523	3.49	1	0	115	8.20
ADHD children taught	522	4.23	2	0	78	7.72
Assess medication	526	1.91	0	0	115	6.72
Number of articles on ADHD read	524	2.64	1	0	10	3.07
Workshops attended on ADHD	519	0.77	0	0	5	1.28
Confidence to teach ADHD child	511	3.80	4	1	7	1.63

Note: The valid number indicates the number of respondents who have supplied an answer to the particular question

3.4 INSTRUMENT USED

The instrument that was used in this study to measure teachers' knowledge of and misperceptions about ADHD is the Knowledge of Attention Deficit Disorders Scale (KADDS). This questionnaire was developed by Sciutto (*et al*., 2000) and was previously used in six New York area public schools. The KADDS questionnaire was also used in part in a study in Victoria Australia (Kos *et al*., 2004). The questionnaire was obtained from Professor Mark Sciutto from Muhlenberg College in the USA, who granted permission for the questionnaire to be used in this study (see Addendum B).

KADDS is a 41-item rating scale designed to measure teachers' knowledge and misperceptions of Attention-Deficit/Hyperactivity Disorder. Professor Sciutto encouraged the researcher to add more items to this rating scale. (Two questions were added to the original 39 questions, i.e. questions 40 and 41). The two questions that were added to the questionnaire arose from the study of recent literature. It is pointed out that children with ADHD and gifted children often present with similar symptoms that could result in a wrong diagnosis (question 40). Behavior rating scales can never be used to make a diagnosis of ADHD, in stead it should be viewed as an expression of behavior (question 41). It seems that behaviour checklists are often used in practice to determine a diagnosis of ADHD. The researcher considered these two aspects to be important in the assessment process.

Each KADDS item is phrased in terms of a statement about ADHD and uses a *true* (T), *false* (F) or *don't know* (DK) format. This format allows for the differentiation of what teachers do not know from an incorrect belief or misperception. Making this distinction could lead to more effective intervention programmes. Most previous studies have measured ADHD knowledge through a series of only true-false questions about ADHD. The use of this format makes it possible for a respondent have a 50% chance of guessing the correct answer. These "incorrect guesses" could lead to inaccurate estimates about teachers' knowledge (Sciutto *et al*., 2000:116). The present study examined teachers' knowledge and misperceptions of ADHD within three areas, namely *symptoms/diagnosis* of ADHD, *general knowledge* about the nature, causes and outcome of ADHD and the *treatment* of ADHD, using a series of *true-false-don't know* items. In Chapter 4 the questions and the responses to each of the questions will be

discussed individually. Thereafter teachers' knowledge of the three areas will be discussed to determine the broad patterns of a lack of knowledge or misperceptions that need to be addressed.

When the KADDS was constructed, a deliberate effort was made to include only items that were empirically supported and well documented (Sciutto *et al*., 2000:117). The items in the KADDS questionnaire refer to both positive and negative indicators of ADHD. Items are intended to measure respondents' knowledge of not only what ADHD *is*, but also what it *is not*. Thus items referring to negative behaviours more characteristic of other mental disorders were also included (e.g. stealing, inflated self-esteem). The original questionnaire was administered twice before it was used in the first study and the items were modified after each administration. Bender (1996 in Sciutto *et al*., 2000) "found good internal consistency for the KADDS (Cronbach alfa = 0,81) and significant prepost changes in KADDS scores for each of two types of educational interventions, thus offering preliminiary evidence for the validity of the KADDS". Good internal consistency for the KADDS was found in the present study (Cronbach alfa = 0,81 for *correct* responses and even higher for the *incorrect* responses).

The decision to create the three subscales aimed at determining broad patters or coherence exist in teachers' knowledge or misperceptions in the areas mentioned in order to develop more effective educational interventions. An expert group consisting of 40 upper-level doctoral students in clinical and school psychology was used to identify and group items in terms of the subscales. When 75% of these students were in agreement of an item on a subscale, it was considered part of that subscale (Sciutto *et al*., 2000:117). A copy of the questionnaire used in this study is included in Addendum A.

The questionnaire was translated into Afrikaans and the Afrikaans version was put on the same page next to the English version. Since most of the teachers in the study area are fairly bilingual, it meant that the participants could check to see that they had understood the meaning of each question. A pilot study was done where 6 teachers from different schools were asked to complete the questionnaire. No language problems were encountered during the pilot study.

3.5 PROCEDURE FOR ADMINISTRATION

The principals of the identified schools were contacted and appointments were made to discuss the study and obtain permission for the teachers in their schools to take part voluntarily in the study. After an appointment was made, a letter was faxed to each principal confirming the appointment and stating the motivation for the intended study and the reason for the visit (see Addendum D).

At the meetings with the headmasters the study was discussed, permission for the teachers in their schools to take part in the study was obtained and the headmasters were assured that the schools' responses would be kept anonymous. The questionnaires were then handed over. A letter addressed to each teacher explaining the motivation for and importance of the study and thanking them for their cooperation, was attached to each questionnaire (Addendum E). It was emphasized that taking part in this study was voluntary. To encourage honest responses teachers were not required to identify themselves or their schools on the questionnaire. A date on which the questionnaires were to be collected was set with the headmasters. Two days prior to the collection of the questionnaires, a fax was sent thanking them again for their cooperation and reminding them of the date of collection. According to Rosnow and Rosenthal (1999:225), these procedures to stimulate the participation of the people who take part in the study, "… provide incentives to researchers to act ethically and humanely".

3.6 RESPONSE

The questionnaires and demographic questionnaires were administered to 824 teachers from primary schools in the periphery of the Cape Town Metropole. Of the 824 questionnaires distributed, 559 were returned. Of these, seven questionnaires were not usable due to substantial missing data, leaving an overall usable number of 552 completed questionnaires: a response rate of 67% (552/824). The response of the present study was much better than the one conducted in the New York area (400 questionnaires were distributed with a response rate of 37% (149/400).

The high response rate of the present study can probably be ascribed to the personal contact with the headmasters. The researcher also went to a few of the schools to collect outstanding questionnaires. Feedback on the study as soon as it was completed was promised. The high response rate could also be ascribed to the explanation of the motivation, scientific importance and value of the study in the letter that was addressed to each teacher. The assurance that the identities of the teachers and schools would not be revealed most probably allayed unwarranted fears of unfavourable evaluation. According to Rosnow and Rosenthal (1999:223,224) these techniques (e.g., personal contact, using reminders and follow-up communications, explaining the scientific importance and value of the study, ensuring the participants of confidentiality) are favourably linked to increased participation in surveys.

3.7 STATISTICAL ANALYSIS

The statistical application software employed to analyse the data collected from the questionnaires was Statistica Version 6.1.409. It was used to determine the mean, median, minimum, maximum and standard deviation of demographic characteristics.

To measure teachers' knowledge about ADHD on the Total or Combined Scale and the following three subscales: *symptoms/diagnosis*, *treatment* and *general knowledge* 2-way Analysis of Variance (ANOVA) was used.
The Bonferonni corrections were used to determine possible differences in frequency of responding, e.g. *don't know*, on the three subscales.

Pearson correlations were used to explore the relationships between teachers' knowledge of ADHD and various demographic characteristics.

3.8 CONCLUSION

In this chapter the research design and methodology, the data collection, the research instrument used to conduct this study and the statistical analysis of the data were described.

Using a survey as the method of research enabled the researcher to investigate 552 teachers' knowledge and misperceptions of ADHD. The response of the participants in this study was much better than in a similar study that was undertaken in New York area (Sciutto *et al.,* 2000). This high response rate, as well as the large group of teachers that took part in this study make it possible to generalize the results to the rest of the teaching population with a high level of confidence.

A demographic questionnaire was used to collect personal information of the participants. When these results are compared with the information that the teachers in the New York area supplied the very big difference in educational level of the teachers there and in the Cape Town Metropole Periphery was revealed. It would be interesting to see what the effect, if any, of the educational level has on the knowledge of the teachers in the Cape Town Metropole Periphery and in the New York area.

In Chapter 4 the results of the measurement of teachers' knowledge and misperceptions as measured by the KADDS scale and correlations between the performance levels on the KADDS scale and demographic features are presented and discussed.

Chapter 4

RESULTS:
PRESENTATION AND DISCUSSION

4.1 INTRODUCTION

In this chapter the statistical analysis of the survey results is presented and discussed. In Section 4.2 teachers' average score per individual KADDS question is presented and compared with findings of other ADHD-surveys and opinions of experts on ADHD in South Africa and abroad.

Section 4.3 gives a broader overview of the results in terms of three groups of questions of the KADDS scale forming three subscales. These three subscales show teachers' knowledge and perceptions in three broad domains, namely teachers' *general knowledge* of ADHD, knowledge about the *symptoms and diagnosis* of ADHD and knowledge about *treatment* of ADHD. Pairwise analysis of variance is used to compare teachers' mean scores of *correct, don't know and incorrect* responses on each subscale to determine if teachers generally have less knowledge and misperceptions of ADHD in some domain(s) than others. Identified specific shortcomings (Section 4.2) and broader patterns in terms of the three domains (Section 4.3) should contribute to guidelines for intervention strategies to address teachers' lack of knowledge and misperceptions on ADHD, as will be discussed in Chapter 5.

In Section 4.4 the relationships between teachers' demographic characteristics and knowledge of ADHD (total KADDS score) will be presented, based on a correlation test. Teachers' demographic characteristics focus mainly on training and teaching experience and exposure to learners with ADHD. It was expected that these results should point out some strategic levels of an intervention programme that will be addressed in Chapter 5.

4.2 PERFORMANCE PER KADDS QUESTION

The total scores and percentages of the *correct* (items answered correctly), *don't know* and *incorrect* (items answered incorrectly) responses of 552 teachers for each of the 41

KADDS questions, as well as the mean scores and mean percentages of the *correct*, *don't know* and *incorrect* responses of the 41 KADDS questions are given in Table 4.1. The table also shows the subscale to which each question is assigned.

The percentage scores of the *correct*, *don't know* and *incorrect* responses for each of the 41 KADDS questions given in Table 4.1 are presented graphically in Figure 4.1.

Table 4.1: Results per KADDS question in terms of number and percentages of *correct*, *don't know* and *incorrect* responses

Question	Sub-scale	Number of responses				%		
		Correct	*Don't know*	*Incorrect*	Total	*Correct*	*Don't know*	*Incorrect*
1	G	51	329	172	552	9.2	59.6	31.2
2	T	262	193	97	552	47.5	35	17.6
3	D	414	93	45	552	75	16.8	8.2
4	G	81	293	178	552	14.7	53.1	32.2
5	D	259	187	106	552	46.9	33.9	19.2
6	G	108	391	53	552	19.6	70.8	9.6
7	D	302	133	117	552	54.7	24.1	21.2
8	T	213	210	129	552	38.6	38	23.4
9	D	504	25	23	552	91.3	4.5	4.2
10	T	418	104	30	552	75.7	18.8	5.4
11	D	276	158	118	552	50	28.6	21.4
12	T	255	255	42	552	46.2	46.2	7.6
13	G	355	169	28	552	64.3	30.6	5.1
14	D	220	182	150	552	39.9	33	27.2
15	T	297	212	43	552	53.8	38.4	7.8
16	D	413	129	10	552	74.8	23.4	1.8
17	G	196	275	81	552	35.5	49.8	14.7
18	T	173	232	146	551	31.4	42.1	26.5
19	G	147	229	176	552	26.6	41.5	31.9
20	T	326	189	37	552	59.1	34.2	6.7
21	D	327	149	76	552	59.2	27	13.8
22	G	326	116	110	552	59.1	21	19.9
23	T	51	141	360	552	9.2	25.5	65.2
24	G	359	109	84	552	65	19.7	15.2
25	T	224	271	57	552	40.6	49.1	10.3
26	D	483	42	27	552	87.5	7.6	4.9
27	G	69	139	344	552	12.5	25.2	62.3
28	G	124	178	250	552	22.5	32.2	45.3
29	G	213	236	103	552	38.6	42.8	18.7
30	G	63	239	250	552	11.4	43.3	45.3
31	G	421	52	79	552	76.3	9.4	14.3
32	G	396	83	73	552	71.7	15	13.2
33	G	238	152	162	552	43.1	27.5	29.3
34	T	57	226	269	552	10.3	40.9	48.7
35	T	61	454	37	552	11.1	82.2	6.7
36	T	324	209	19	552	58.7	37.9	3.4
37	T	147	265	140	552	26.6	48	25.4
38	D	189	230	133	552	34.2	41.7	24.1
39	G	96	231	225	552	17.4	41.8	40.8
40	D	169	205	178	552	30.6	37.1	32.2
41	G	45	293	214	552	8.2	53.1	38.8
Mean score		**235**	**195**	**121**		**42.6**	**35.4**	**22**

N = 522

Note: G = question of general knowledge subscale;
D = question of diagnosis/symptoms subscale;
T = question of treatment subscale

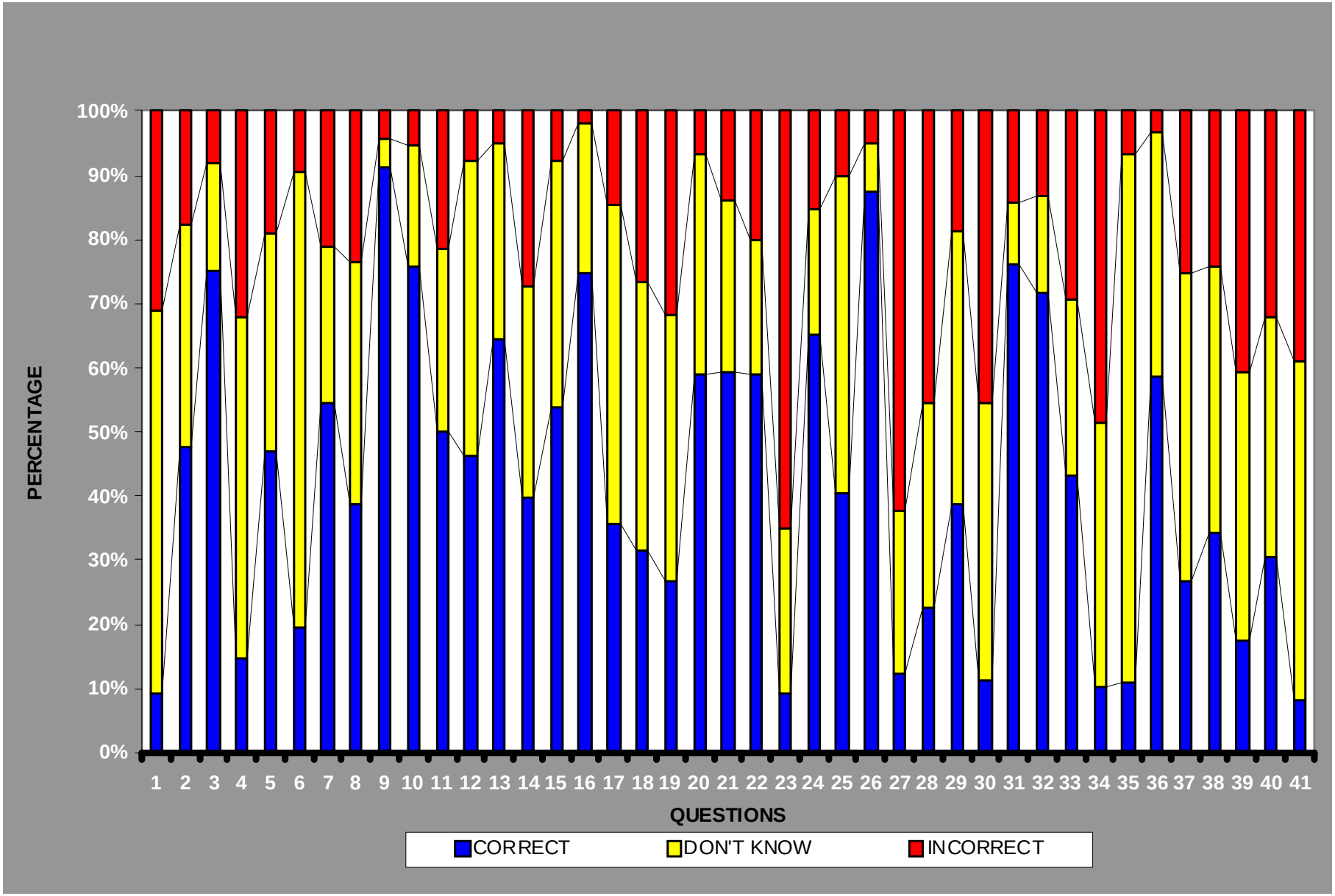


Figure 4.1: Histogram showing percentages of *correct*, *don't know* and *incorrect* responses to the 41 KADDS questions

In Table 4.2 teachers' average score per individual KADDS question is presented and discussed.

Don't know responses pointed to a lack of knowledge. *Incorrect* responses pointed to misperceptions

The following is the key to the correct and the false statements:
(Correct response is *false:* Items: 1, 2, 7, 11, 12, 14, 18, 19, 22, 23, 24, 27, 28, 29, 30, 34, 35, 36, 37, 38, 39,41)
(Correct response is *true*: Items: 3, 4, 5, 6, 8, 9, 10, 13, 15, 16, 17, 20, 21, 25, 26, 31, 32, 33, 40)

Table 4.2: Comments on scores of correct, don't know and incorrect responses to each of the 41 KADDS questions

No		% Correct	% Don't know	% Incorrect	Discussion
1.	Most estimates suggest that ADHD occurs in approximately 15% of school age children.	9. 2	59.6	31.2	There is a clear lack of knowledge about the epidemiology of ADHD. A substantial percentage of respondents (31.2%) indicated that 15% of all school children have ADHD. Holding this view could lead to teachers' attributing many difficult behaviours to ADHD which could lead to many wrong referrals (Livingston, 1997:9).
2.	Current research suggests that ADHD is largely the result of ineffective parenting skills	47.5	35.0	17.6	A substantial minority of respondents seem not to know what the causes of ADHD are, which could influence their views about treatment (Pfiffner & Barkley in Barkley, 1998a:459).
3.	ADHD children are frequently distracted by extraneous stimuli.	75.0	16.8	8.2	Teachers seem to know the symptoms of ADHD. However, in a study done by Pelham & Evans (1992:289) they found that the symptom "easily distracted", a hallmark symptom of ADHD, had the lowest positive predictive power that the child has this disorder. Yet, the absence of this symptom indicates the absence of this disorder.
4.	ADHD children are typically more compliant with their fathers than with their mothers.	14.7	53.1	32.2	ADHD children are a heterogeneous population whose symptoms vary among setting, caregivers, and task complexity (Barkley, 1998a:73,74,75). Mothers seem to have more problems with ADHD children, while fathers seem to have fewer problems. One reason could be the fact that the fathers are firmer in their discipline of the children (Barkley, 1998a:75; Stein, Martin T. *et al*. 2001). The role of environmental factors in reducing or enhancing ADHD-related symptoms is important knowledge to have in communication with the parents of children with ADHD.
5.	In order to be diagnosed with ADHD, the child's symptoms must have been present before age 7	46.9	33.9	19.2	In the discussion in Section 2.3.2 the diagnostic criteria other than the symptoms are mentioned. It is important that teachers are aware of these other diagnostic criteria, and that they do not just rely on the symptoms to make an appropriate referral, as these referrals have often been used as a predictor of a child's symptoms (Pelham *et al*., 1992).

No		% Correct	% Don't know	% Incorrect	Discussion
6.	ADHD is more common in the 1st degree biological relative (i.e. mother, father) of children with ADHD than in the general population.	19.6	70.8	9.6	A significant majority of the respondents showed a lack of knowledge about causes of ADHD. Evidence points to genetic factors as one of the greatest contributors to this disorder (Consortium of International Scientists, 2002). Having this knowledge should enable teachers to communicate better with the parents of children, to understand that one or both of the parents may have/had ADHD and to be realistic about structure at the home of the child with ADHD.
7.	One symptom of ADHD children is that they have been physically cruel to other people.	54.7	24.1	21.2	Physical cruelty is a symptom that is associated with Conduct Disorder which is often comorbid with ADHD (DSM-IV TR, 2000:98). It is not one of the symptoms of ADHD. There seem to be a lack of knowledge/incorrect view about the nature of a child with ADHD.
8.	Antidepressant drugs have been effective in reducing symptoms for many ADHD children	38.6	38.0	23.4	Due to the demonstrated efficacy and widespread use of medication, teachers should become familiar with the types of medications that are prescribed (DuPaul & Stoner, 2003:191). The majority of participants (responses of incorrect and don't know) seem to have a lack of knowledge about the medications and the use of it. The use of antidepressants produce similar behavioural effects as stimulant medication in up to 70% of children with ADHD. Antidepressants may therefore be helpful for children with ADHD who do not respond to stimulant medication (Kollins *et a*l., 2001:8; DuPaul & Stoner, 2003:192,193).
9.	ADHD children often fidget or squirm in their seats.	91.3	4.5	4.2	A high percentage of respondents knew that children with ADHD are fidgety of squirm in their seats. Although this is one of the hallmark symptoms of ADHD, it has very little predictive power to indicate the presence of this disorder (Pelham & Evans, 1992:289).
10.	Parent and teacher training in managing an ADHD child are generally effective when combined with medication treatment	75.7	18.8	5.4	A majority of respondents knew that multifaceted methods are applied for effective treatment of ADHD. The emphasis in intervention is on the acquisition of developmental skills, adaptations to the natural environments (e.g., school, home) to promote performance and to address the underlying neurological dysfunctions (Chu, 2003:256). See Section 2.4 for a discussion of the use of medication as the sole treatment and its limitations. Behavioural parent training and behavioural interventions in the classroom are among the criteria for well-established interventions for ADHD (Pelham *et al.* 1998:200). Although both forms of interventions are effective, there is more empirical support for classroom-based behavioural intervention, than for clinic-based parental training (Pisecco *et al*., 2000:414).

No		% Correct	% Don't know	% Incorrect	Discussion
11.	It is common for ADHD children to have an inflated sense of self-esteem or grandiosity	50.0	28.6	21.4	Many children with ADHD have problems with self-esteem by late childhood (Barkley, 2000:93). They encounter multiple problems in their everyday living and may feel despair, because they feel they cannot cope with everyday life (Mash & Wolfe, 2002:111). The symptoms of ADHD often leave the child with a sense of being and having poor coping strategies and an impaired sense of efficacy (McClure & Teyber, 1996:188). It is thus more common for children with ADHD not to have an inflated self-esteem. Half of the teachers thought the children with ADHD have an inflated self-esteem
12.	When treatment of an ADHD child is terminated, it is rare for the child's symptoms to return	46.2	46.2	7.6	It seems that many teachers do not know that ADHD is not curable by treatment. A large percentage of children with ADHD are at long-term risk for this disorder (Barkley, 1998a:217). The focus of treatment should be on helping the child to compensate for his behavioural control problems and not to "cure" this disorder (DuPaul & Stoner, 2003:20).
13.	It is possible for an adult to be diagnosed with ADHD	64.3	30.6	5.1	Literature points out that as many as 50% of children with ADHD will evidence symptoms of this disorder in adulthood (DuPaul & Stoner, 2003:19). Research suggests that the prevalence rate for all subtypes of ADHD among adults is 4,7% (Barkley, 1998a: 83). Keeping in mind that ADHD has a strong genetic component (Consortium of International Scientists, 2002:97), the assumption can be made that there could be parents of children that are diagnosed with ADHD who also have ADHD, but who have not been diagnosed (Erk, 1997:7, Warner, 1995 in White & Rouge, 2003:290). Having an adequate frame of reference of ADHD should facilitate communication with parents.
14.	ADHD children often have a history of stealing or destroying other people's things	39.9	33.0	27.2	A history of stealing or destroying other people's things are symptoms of Conduct Disorder and not of ADHD (DSM-IV TR, 2000:99). Conduct Disorder often co-occurs with ADHD, but can also occur without ADHD (Barkley, 1998a:142). See Question 7.
15.	Side effects of stimulant drugs (e.g. Ritalin) used for treatment of ADHD may include mild insomnia and appetite reduction.	53.8	38.4	7.8	Although 53.8% of respondents seem to be aware of the side effects of stimulant medication, a substantial percentage of respondents are not knowledgeable about the possible side effects of medication that very often forms part of the treatment of a child with ADHD. Side effects like mild insomnia and appetite reduction can often be eliminated by reducing the dose of medication. Careful monitoring is thus important and could make a difference (Mash & Wolfe, 2002:121; DuPaul & Stoner, 2003:222).

No		% Correct	% Don't know	% Incorrect	Discussion
16.	Current wisdom about ADHD suggests two clusters of symptoms: One of inattention and the other consisting of hyperactivity impulsivity	74.8	23.4	1.8	A majority of the respondents seem to be knowledgeable about the subtypes of ADHD. See Section 2.3.2 for a discussion of the diagnostic criteria.
17.	Symptoms of depression are found more frequently in ADHD children than in non-ADHD children.	35.5	49.8	14.7	Symptoms of depression are found more frequently in ADHD children than in non-ADHD children (Barkley, 1998a:140, Willcut *et al.,* 1999 in Mash & Wolfe, 2002:111). See comments on Question 11.
18.	Individual psychotherapy is usually sufficient for the treatment of most ADHD children	31.4	42.1	26.5	Treatment of ADHD should occur in all the domains where the child experiences difficulties (Pelham & Fabiano, 2001:317). Most children with ADHD experience significant problems with academic work and social skills. Environments should be adjusted at school where learning can be promoted and positive social interactions be facilitated (DuPaul & Stoner, 2003:139). The teachers will have to form part of the intervention programme for these children.
19.	Most ADHD children "outgrow" their symptoms by the onset of puberty and subsequently function normally in adulthood.	26.6	41.5	31.9	There seems to be a big lack of knowledge and misperceptions about the long term outcome of ADHD. As discussed in Section 2.2.4.2 a small group of children do not show significant ADHD symptoms when they reach adolescence. The overall majority (more than 50%) of the children continue to experience difficulties and for many children ADHD is a lifelong disorder (Mash & Wolfe, 2002:114). In the light of the long-term risk of this disorder, teachers should constantly try to create environments to help the children to succeed academically, emotionally and socially (DuPaul & Stoner, 2003:20). A minority of respondents hold the view that children will "outgrow" their symptoms by adolescence. Holding this view could imply that the seriousness of this disorder is overlooked. When adolescents with ADHD are compared with non-ADHD children, those with ADHD are at higher risk for school suspension, academic failure, dropping out of school and substance abuse (DuPaul & Stoner, 2003:19).
20.	In severe cases of ADHD, medication is often used before other behavior modification techniques are attempted.	59.1	34.2	6.7	The diagnosis of ADHD is not automatically an indication of the need of stimulant medication. When the behaviour of the child is unmanageable or is causing distress to the family, medication may prove the fastest and most effective way to deal with this crisis until other forms of treatment can be started (Barkley, 1998a:529).

No		% Correct	% Don't know	% Incorrect	Discussion
21.	In order to be diagnosed as ADHD, a child must exhibit relevant symptoms in two or more settings (e.g. home, school).	59.2	27.0	13.8	Nearly 60% of the respondents knew that the symptoms of ADHD have to be present in two or more settings before a diagnosis can be made.
22.	If an ADHD child is able to demonstrate sustained attention to video games or TV for over an hour, that child is also able to sustain attention for at least an hour of class or homework.	59.1	21.0	19.9	Symptoms of ADHD vary across tasks and settings. The children with ADHD work best on tasks that they have chosen themselves and that they find interesting. They attend automatically to things they enjoy, but can have great difficulty in doing new things or less enjoyable tasks (Mash & Wolfe, 2002:102). The primary deficit in children with ADHD seems to be their great difficulty with persistence of effort, or sustained attention. These children find it very difficult to keep attending to dull, boring, repetitive tasks such as homework and independent schoolwork (Barkley, DuPaul & McMurray, 1990, cited in Barkley, 1998:57).
23.	Reducing dietary intake of sugar or food additives is generally effective in reducing the symptoms of ADHD	9.2	25.5	65.2	Numerous studies have been done on the effect of the diet on the symptoms of ADHD (Sue *et al.*, 1997:480; Barkley, 2000:75-77). No scientific support can be found for the influence of the diet as the cause for ADHD or that changing the diet could influence the severity of the symptoms. Dietary factors play a minimal role in ADHD (DuPaul & Stoner, 2003:15). Only a very small number (5% or fewer) of children, mainly preschoolers showed a slight increase in inattentiveness or activity when sugar or food additives are included in their diet (Barkley, 2000:75). The majority of the respondents see the reduction of sugar and or food additives in the diet of children as an effective way to reduce the symptoms of ADHD. When teachers have this view about the effect of the diet on the ADHD symptoms, it could happen that they may recommend that the child's diet has to change (DiBattista & Shepherd, 1993 in Sciutto *et al*., 2000:117). This form of treatment could prove to be expensive, provide false hope for a quick cure and eventually delay empirically supported treatments that have proven effective (Mash & Wolfe, 2002: 125).
24.	A diagnosis of ADHD by itself makes a child eligible for placement in special education.	65.0	19.7	15.2	A diagnosis of ADHD makes a child not eligible for placement in special education. In South Africa education is moving towards inclusive education where the teachers have the responsibility to provide assistance for the diverse needs of their learners, including learners with ADHD (Engelbrecht *et al*., 2001, Holtz & Lessing, 2002:103).

No		% Correct	% Don't know	% Incorrect	Discussion
25.	Stimulant drugs are the most common type of drug used to treat children with ADHD.	40.6	49.1	10.3	Central nervous system stimulant medication is one of the most effective and commonly prescribed interventions for this disorder (DuPaul & Stoner, 2003:223). There appears to be a lack of knowledge about treatment among the respondents.
26.	ADHD children often have difficulties organizing tasks and activities.	87.7	7.6	4.9	Respondents are knowledgeable about the problems children with ADHD have with organizational skills. It has been found that children with ADHD are less skilled in the use of complex problem solving strategies and organizational skills (Barkley, 2000:99). Research suggests that insufficient effort or inefficient use of proper strategies during the task could be responsible for this problem (DuPaul & Stoner, 2003:73).
27.	ADHD children generally experience more problems in unfamiliar situations than in familiar situations	12.5	25.2	62.3	According to studies done by Barkley (1997) and Zentall (1985) children with ADHD will show fewer behavioural problems in unfamiliar surroundings than in familiar surroundings (in Barkley, 1998a:76). It is not uncommon to find that learners having ADHD are given a far better behaviour rating in the beginning of the academic year when they are presented with new teachers, classroom and peers (Barkley, 1998a:76). The majority of the respondents hold the view that unfamiliar situations do not significantly influence on children with ADHD than familiar situations.
28.	There are specific physical features which can be identified by medical doctors (e.g. pediatrician) in making a definitive diagnosis of ADHD.	22.5	32.2	45.3	There is no objective medical finding that can confirm the diagnosis of ADHD (Accardo *et al.* 2000:162). The respondents showed a great lack of knowledge and a misperception about diagnosis.
29.	In school age children, the prevalence of ADHD in males and females is equivalent.	38.6	42.8	18.7	According to the DSM-IV TR (2000) and the American Academy of Pediatrics (2000) the disorder is more frequent in males than in females, about 9.2% in males and 2.9% in females. See Section 2.2.4.1.

No		% Correct	% Don't know	% Incorrect	Discussion
30.	In very young children (less than 4 years old), the problem behaviour of ADHD children (e.g. hyperactivity, inattention) are distinctly different from age appropriate behaviours of non ADHD children.	11.4	43.3	45.3	The appearance of ADHD-related behaviour (significant inattentiveness and hyperactivity) in very early childhood is not indicative of ADHD later in childhood (Barkley, 1998a:189; DuPaul & Stoner, 2003:113). Studies have shown that many parents rate their preschool children as inattentive and overactive. In a study done by Palfrey *et al*. (1985 in Barkley, 1998a:189) it was found that 40% of preschool children had sufficient problems with inattention that caused concern in their parents and their teachers. This study and other studies have demonstrated that the majority of these causes of concerns disappear within 3 to 6 months (Barkley, 1998a:189). It is important to remember when making a referral that it is both the degree of the symptoms and their duration which will determine a diagnosis. The respondents showed a lack of knowledge here. According to Barkley (1998a:68) ADHD-related symptoms can be seen as "behavioral immaturity" and it is difficult to distinguish ADHD symptoms until at least 3 years of age
31.	Children with ADHD are more distinguishable from normal children in a classroom setting than in a free play situation	76.3	9.4	14.3	Children with ADHD have problems with persistence of effort or sustained attention, inhibiting their behaviour in response to situational demands and developmentally inappropriate levels of activity (Barkley, 1998a: 57,59,60). These difficulties are more apparent in the classroom than in free play settings. Most of the respondents showed that they are aware of this.
32.	The majority of ADHD children evidence some degree of poor school performance in the elementary school years.	71.7	15.0	13.2	Most children with ADHD often experience tremendous difficulty with academic performance (Barkley, 2000:98; Mash & Wolfe, 2002:106). See Section 2.2.6.1.
33.	Symptoms of ADHD are often seen in non-ADHD children who come from inadequate and chaotic home environments.	43.1	27.5	29.3	There seem to be incorrect views (misconceptions) and a lack of knowledge about the influence of the home situation on ADHD. Psychosocial factors do not cause ADHD, but may lead to ADHD-like symptoms or excarbate the symptoms (Mash & Wolfe, 2002:118).
34.	Behavioral/Psychological interventions for children with ADHD focus primarily on the child's problems with inattention.	10.3	40.9	48.7	Behavioral/psychological intervention focuses on inattentive, impulsive and hyperactive behavior and the managing of it at home or in the classroom. Interventions strategies should be individualized based on the specific behavior, age of the child and the needs and constraints of the classroom (DuPaul & Eckert, 1997b:376). Behavior interventions include positive reinforcement and response cost contingencies.

No		% Correct	% Don't know	% Incorrect	Discussion
35.	Electroconvulsive Therapy (i.e. shock treatment) has been found to be an effective treatment for severe cases of ADHD.	11.1	82.2	6.7	The lack of knowledge here, only points to the lack of knowledge about the treatment of ADHD.
36.	Treatments for ADHD which focus primarily on punishment have been found to be the most effective in reducing the symptoms of ADHD	58.7	37.9	3.4	More than half of the respondents understand that punishment is not the most effective means of reducing the symptoms of ADHD. Punishment is not very effective at changing behaviour. Children with ADHD most probably receive a great deal of negative consequences for their impulsive, inattentive and hyperactive behaviour. Positive feedback and incentives should be used before punishment (Barkley, 2000:148). What has been found most effective in reducing the symptoms of ADHD is stimulant medication (Kollins *et al*., 2001:2).
37.	Research has shown that prolonged use of stimulant medications leads to increased addiction (i.e. drug, alcohol) in adulthood	26.6	48.0	25.4	The respondents showed a clear lack of knowledge about the prolonged use of stimulant medication. There is little evidence in the literature that stimulant treatment of children with ADHD increases the risk of later substance abuse. It is suggested in the literature that the continued severe ADHD symptoms and comorbid CD could increase the risk of substance abuse (Hechtman & Greenfield, 2003:791,792).
38.	If a child responds to stimulant medications (e.g. Ritalin) then they probably have ADHD	34.2	41.7	24.1	Studies have clearly shown that stimulant drugs improve the performance of most people, regardless of a diagnosis of ADHD. Thus, if a child is more attentive while on stimulant medication, it does not mean that (s)he has a mental disorder (Livingston, 1997:6). The high percentage of respondents that are not aware of this aspect of stimulant medication, may wrongly attach a diagnosis of ADHD to a child because of the child's response to the medication, or give wrong advice to parents (Porter, 2000 in Snider *et al*. 2003:47).
39.	Children with ADHD generally display an inflexible adherence to specific routines or rituals.	17.4	41.8	40.8	A high percentage of respondents show a lack of knowledge or a wrong perception about the hallmark symptom of ADHD, behavioural disinhibition. As pointed out in Section 2.3.1.2 there is now substantial evidence that behavioural disinhibition or poor control and inhibition of behaviour is the hallmark symptom of ADHD (Barkley, 1998:60). Children with ADHD have trouble with routine, because of the lack of internal structure (Mash & Wolfe, 2002:120). They experience difficulties in following rules and they display an excessive variability in their responses to situations (Barkley, 2000:34). Thus, children with ADHD do not display an inflexible adherence to specific routines and rituals.

No		% Correct	% Don't know	% Incorrect	Discussion
40.	The characteristics of a gifted child and a child with ADHD are often similar.	30.6	37.1	32.2	There seems to be a lack of knowledge about the fact that children with ADHD and children who are gifted often engage in similar behaviours (Hartnett *et al.*, 2004:74). A misdiagnosis of ADHD on gifted children can be very harmful and can contribute to the child's continued failure in the learning environment (Baum & Olenchak, 2002:77). Research has shown that the referrals for and the incidence of ADHD among gifted children have been growing at a high rate (Silverman, 1998; Webb & Latimer, 1993 cited in Baum & Olenchak, 2002:78).
41.	ADHD can be reliably diagnosed via use of behavioural rating scales (e.g. Conners).	8.2	53.1	38.8	A significant majority do not know or wrongly believe that a behaviour rating scale can be used diagnostically (see Section 2.3.3.2 for a discussion of the use of rating scales in the diagnostic process). It should be stressed that these behaviour rating scales only address the expressions of behaviour instead of the causes of the behaviour and that the behaviour rating scale is not diagnostic in itself (Hartnett *et al*., 2004:74).

The results of this questionnaire suggest that there is a substantial lack of knowledge about ADHD among teachers in primary schools in the periphery of the Cape Metropole. Teachers' overall percentage score of *correct* responses was 42.6%, 35.4% for *don't know* responses, indicating a lack of knowledge, and 22% for *incorrect* responses, pointing to misperceptions. These results are similar to those of Sciutto *et al*. (2000) who reported an average of 47.8% for *correct* responses for their sample of American teachers, and somewhat lower than the results of Kos *et al*. (2004) who reported that 60.7% of the items on the knowledge questionnaire were correctly answered by teachers in Australia.

The total scores and percentages of *correct*, *don't know* and *incorrect* responses to the individual KADDS questions were presented to differentiate between the concepts on which there is a lack of knowledge and concepts on which respondents have misperceptions. Teachers were very knowledgeable about the hallmark symptoms of ADHD, with more than 75% of the respondents correctly identifying the symptoms of distractibility, fidgeting, difficulties with organization and of the primary clusters of ADHD symptoms. Teachers were also quite aware of the fact that parent and teacher training in combination with medication are quite effective in the treatment of ADHD (75.7%) and that the child with ADHD will be more distinguishable in a classroom setting than in a free play situation (76.3%).

The present data suggest education on the epidemiology of ADHD is necessary (59.6% of the respondents showed a lack of knowledge and 31.2% held a misperception), the causes of ADHD (the fact that genetics are a great contributor to ADHD [70.8% of the respondents showed a lack of knowledge and 9.6% held a misperception]), situational variations of the symptoms (e.g., familiar situations versus unfamiliar situations [25.2% of the respondents showed a lack of knowledge and 62.3% held a misperception], behaviour of the child in the presence of the mother versus the father [53.1% of the respondents showed a lack of knowledge and 32.2% showed a misperception], playing video games for a long period, but are not able to complete his schoolwork [21% of the respondents showed a lack of knowledge and 19.9% had a misperception), the purpose of behaviour rating scales (53.1% of the respondents showed a lack of knowledge while 38.8 % held a misperception), and the long term outcome of ADHD (41.5% of the respondents

indicated that they do not know and 31.9% believed that most children "outgrow" ADHD by puberty).

Misperceptions about ADHD are particularly resistant to change (Sciutto *et al*., 2000:121; Kos *et al*., 2004:525). In the present study for example and consistent with previous research, 65.2% (see Question 23 in Table 4.2) of the respondents (in the present study) incorrectly believe that reducing dietary intake of sugar or food additives will effectively reduce the symptoms of ADHD (Jerome *et al*.,1994:565; Sciutto *et al*., 2000:121; Kos *et al*.. 2004:522). A person without knowledge may be cautious and seek information, but a person who holds a wrong view may not seek additional information and may recommend wrong advice (DiBattista & Shepherd, 1993 in Sciutto *et al*., 2000:117). It is important to be aware of the distinction between misperceptions and a lack of knowledge when interventions for children (where the teacher is involved) and training for teachers are planned. The content of the interventions and training should therefore be targeted at the teachers' level of understanding (Kos *et al*., 2004:525).

4.3 MEASUREMENT IN TERMS OF KADDS SUBSCALES

The 41 individual KADDS questions were grouped to represent three specific content areas on ADHD: *symptoms/diagnosis*, *treatment*, and *general knowledge* of e.g. the nature, course, prevalence and outcome of ADHD. Little empirical data exist to describe broader areas of teachers' knowledge about ADHD. Therefore this study also examined teacher's knowledge and perceptions of ADHD within these three important content areas. If teachers' knowledge within these areas could be identify it could lead to more effective design and evaluation of educational interventions.

Interrelatedness of the three subscales:

The KADDS total scale and the subscales are internally consistent measures of teachers' knowledge of ADHD, as shown in Table 4.3. Each of the KADDS subscales correlated highly with the KADDS total score (range $r = 0.85$ to $r = 0.89$), and there was a high degree of intercorrelation among the three KADDS subscales (range $r = 0.60$ to $r = 0.64$). The high p-values for the KADDS total score and each of its

three component subscales confirm that teachers' knowledge in one domain tended to be significantly related to their knowledge in the other domains.

Table 4.3: Correlation coefficients indicating correlation among KADDS total and subscale scores

Variable	Statistical Parameter	Total KADDS scale (Correct responses)	Subscale		
			General	Diagnosis/ Symptoms	Treatment
Total KADDS scale (Correct responses)	**R**	1.00	0.89	0.86	0.85
	P	----	0.00	0.00	0.00
General knowledge Subscale	**R**	0.89	1.00	0.64	0.62
	P	0.00	----	0.00	0.00
Diagnosis/ Symptoms Subscale	**R**	0.86	0.64	1.00	0.60
	P	0.00	0.00	----	0.00
Treatment Subscale	**R**	0.85	0.62	0.60	1.00
	P	0.00	0.00	0.00	----

N = 522
All correlations are significant at $p < 0,05$

These findings correlated well with the findings of Sciutto *et al*., (2000). In their study they found a high correlation between the KADDS subscales and the KADDS total score (range $r = 0.85$ to $r = 0.91$) and a high degree of intercorrelation between the three KADDS subscales (range $r = 0.63$ to $r = 0.69$).

Table 4.4 compares teachers' mean scores and standard deviation for *correct*, *don't know* and *incorrect* responses to all 41 questions of the total KADDS scale, as well as to the *general knowledge* subscale (16 questions), the *diagnosis/symptoms* subscale (12 questions) and the *treatment* subscale (13 questions). Of particular importance are the relative high mean scores of 14.51 for *don't know* responses and 9,01 for *incorrect* responses compared to 17.48 for *correct* responses on the total KADDS scale, suggesting respectively a major overall lack of knowledge and high level of misperceptions on ADHD.

Table 4.4: Descriptive statistics for teachers' scores on KADDS total scale and subscales

Response	Total scale/ Subscale	Number of items	Mean	Std Dev
Correct	Total	41	17.48	6.19
	General knowledge	16	5.78	2.64
	Diagnosis/symptoms	12	6.62	2.31
	Treatment	13	5.08	2.24
Don't Know	Total	41	14.51	8.86
	General knowledge	16	5.95	3.63
	Diagnosis/symptoms	12	3.20	2.75
	Treatment	13	5.36	3.29
Incorrect	Total	41	9.01	4.49
	General knowledge	16	4.27	2.21
	Diagnosis/symptoms	12	2.19	1.50
	Treatment	13	2.55	2.01

Significance at the 5 percent level

These results address the following hypotheses that were postulated in Chapter 1.

Hypothesis 1: The sum of the scores for the *don't know* and *incorrect* responses will exceed the score for the *correct* responses.

In the present study teachers scores for the *don't know* and *incorrect* responses did exceed the score for the *correct* responses.

Hypothesis 2: Teachers' scores on the *symptoms/diagnosis* subscale for *correct* responses will be lower than the combined score for *don't know* and *incorrect* responses.

Teachers' score on the *symptoms/diagnosis* subscale for *correct* responses exceeded the combined score for *don't know* and *incorrect* responses.

Hypothesis 3: Teachers' scores on the *general knowledge* subscale for *correct* responses will be lower than the combined score for *don't know* and *incorrect* responses.

Teachers' scores on the *general knowledge* subscale for *correct* responses were lower than the combined score for *don't know* and *incorrect* responses.

Hypothesis 4: Teachers' scores on the *treatment* subscale for *correct* responses will be lower than the combined score for *don't know* and *incorrect* responses.

The combined score for *don't know* and *incorrect* responses did exceed the score for *correct* responses on the *treatment* subscale.

Hypotheses 1, 3 and 4 appear to be supported by the findings of this study. Hypothesis 2 does not appear to be supported by this study.

A comparison of subscale scores for *correct* responses shows the highest mean score (6.62) for the *diagnosis/symptoms* subscale. At the same time, this subscale shows the lowest mean scores for *don't know* responses (3.20) and *incorrect* responses (2.19), indicating that teachers know most and have the least misperceptions about the domain of diagnosis and symptoms of ADHD.

Table 4.5 shows the results of a repeated-measures Analysis of Variance (ANOVA) which confirms that the differences in mean scores among the subscales and between the subscales and the total KADDS scale shown in Table 4.4 are in all cases highly significant, even at a 1% level.

Table 4.5: Bonferonni multiple comparisons of teachers' scores on subscales and the total scale

	SCALE/SUBSCALE	F value	p value
Scores for correct responses	Total scale	140.55 *	p < 0.001
	General knowledge with Diagnosis/Symptoms	80.35	p < 0.001
	Diagnosis/Symptoms with Treatment	301.61	p < 0.001
	Treatment with General knowledge	56.11	p < 0.001
Scores for Don't Know responses	Total scale	427.15 **	p < 0.001
	General knowledge with Diagnosis/Symptoms	735.61	p < 0.001
	Diagnosis/Symptoms with Treatment	506.21	p < 0.001
	Treatment with General knowledge	34.20	p < 0.001
Scores for incorrect responses	Total scale	306.25 ***	p < 0.001
	General knowledge with Diagnosis/Symptoms	535.84	p < 0.001
	Diagnosis/Symptoms with Treatment	18.12	p < 0.001
	Treatment with General knowledge	329.62	p < 0.001

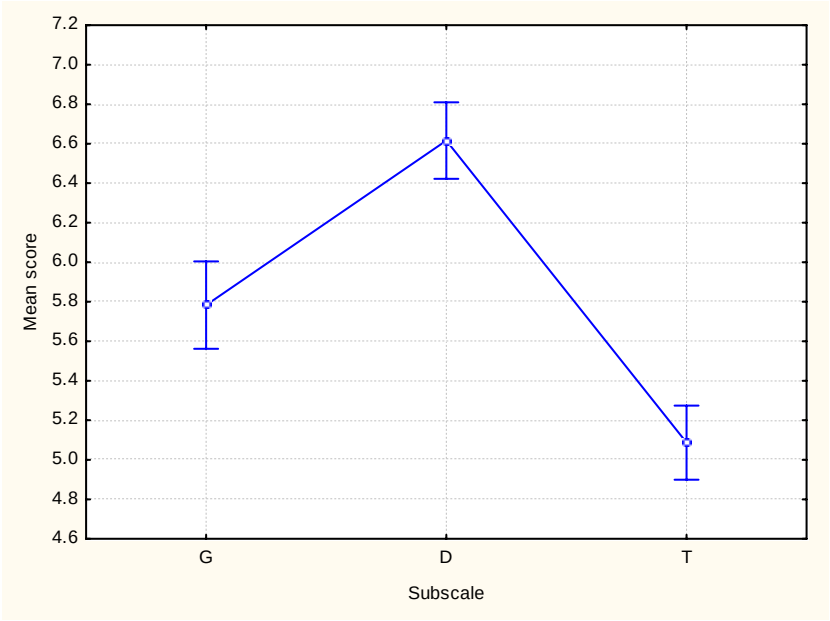
* Refer to Figure 4.2
** Refer to Figure 4.3
*** Refer to Figure 4.4

With regard to *correct* responses, comparison of the mean percentages by subscale indicated a significant difference among the three subscales (F = 140,55, p<0,001). These differences are graphically expressed by the vertical differences between the points in Figure 4.2. Teachers' scores of *correct* responses on the *symptoms/diagnosis* subscale were significantly greater than the score on the *general knowledge* subscale (F = 80.35) and significantly greater than the score on the *treatment* subscale (F = 301.61). Teachers' scores on the *general knowledge* subscale and the *treatment* subscale also differed significantly from each other (at a 1% level), but the difference was smaller (F = 56.11) than the differences mentioned above. The relative better performance of the respondents of this study in terms of the *symptoms/diagnosis* subscale corresponds with the findings of Sciutto *et al*., (2000: 118, 119). The latter study however reported that the *general knowledge* and *treatment* subscales did not differ significantly from each other. This could perhaps be attributed to the fact that an additional item was added to the general knowledge subscale in the present study.

For *don't know* responses, comparison of the mean percentages by subscale (see Table 4.4) indicated an even greater difference among the three subscales (F = 427.15, p<0.001; see Table 4.5). These differences are graphically expressed by the vertical differences between the points in Figure 4.3. Teachers' scores of *don't know* responses on the *symptoms/diagnosis* subscale were significantly lower (at the

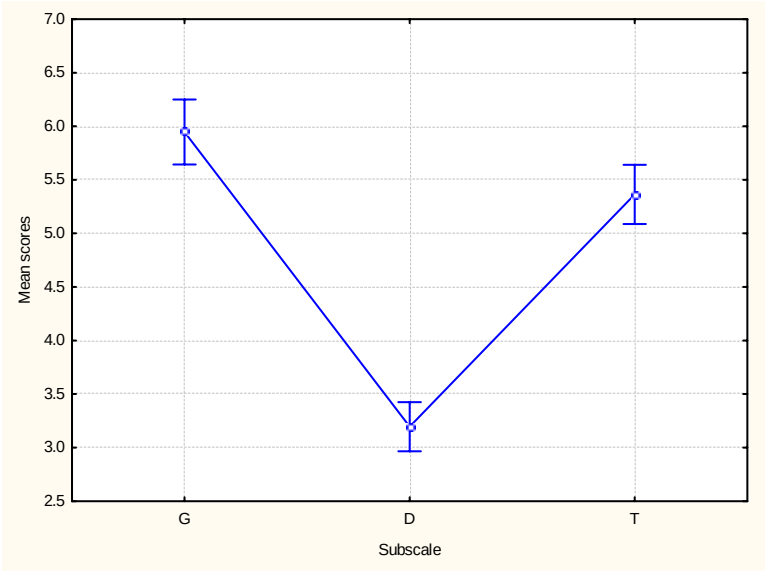
one percent level) than the score on the *general knowledge* subscale (F = 735.61) and significantly lower than the score on the *treatment* subscale (F = 506.21). Teachers' scores on the *general knowledge* subscale and the *treatment* subscale also differed significantly from each other (at the one percent level), but the difference was much smaller (F = 34.20) than the differences mentioned above. The relatively better performance of the respondents in this study on the *symptoms/diagnosis* subscale corresponds with the findings of Sciutto *et al*. (2000: 118, 119), but differs from it in the sense that the *general knowledge* and *treatment* subscales did not show a significant difference from each other.

For *incorrect* responses, comparison of the mean percentages by subscale indicated a significant difference between the three subscales (F = 306.25, $p<0.001$). These differences are graphically expressed by the vertical differences between the points in Figure 4.4. Teachers' scores of *incorrect* responses on the *symptoms/diagnosis* subscale were significantly lower than the score on the *general knowledge* subscale (F = 535.84) and significantly greater than the score on the *treatment* subscale (F = 18.12). Teachers' scores on the *general knowledge* subscale and the *treatment* subscale also differed significantly from each other (at the one percent level) with an F-value of 329.62. The relative better performance of the respondents of this study in terms of the *symptoms/diagnosis* subscale corresponds with the findings of Sciutto *et al.* (2000:118,119). The latter study showed an insignificant difference between the mean percentages of *incorrect* responses on the *treatment* and *general knowledge* subscales.



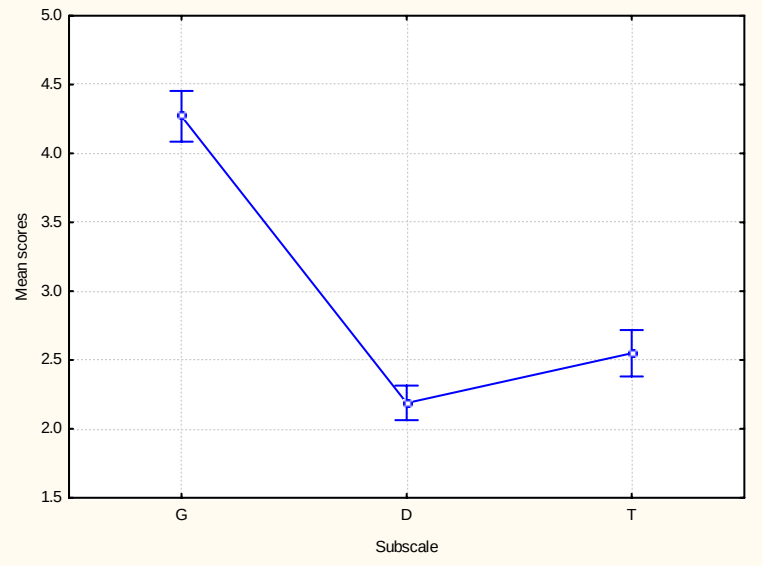
Notes: G = General knowledge subscale; D = Diagnosis/Symptoms subscale; T = Treatment subscale
The vertical bars denote 0.95 confidence intervals
The significant difference among the three subscales is graphically expressed by the vertical differences between the points (F = 140.55, p<0.001)

Figure 4.2: Comparison of the three subscales' mean percentages for *correct* responses



Notes: G = General knowledge subscale; D = Diagnosis/Symptoms subscale; T = Treatment subscale
The vertical bars denote 0.95 confidence intervals
The significant difference among the three subscales is graphically expressed by the vertical differences between the points (F = 427.15, p<0.001)

Figure 4.3: Comparison of the three subscales' mean percentages for *don't know* responses



Notes: G = General knowledge subscale; D = Diagnosis/Symptoms subscale; T = Treatment subscale
The vertical bars denote 0.95 confidence intervals
The significant difference among the three subscales is graphically expressed by the vertical differences between the points (F = 306.25, p<0.001)

Figure 4.4: Comparison of the three subscales' mean percentages for *incorrect* responses

The data from the three subscales are consistent with previous studies on teachers' knowledge of ADHD. Teachers in this study were most knowledgeable about the items on the *symptoms/diagnosis* subscale that correlate with the criteria that are presented in the DSM-IV TR (2000:92). Although the data suggest that teachers are able to recognize the symptoms of ADHD, the data also show that many teachers believe incorrectly that there are physical features which can be identified by medical doctors in making a definitive diagnosis of ADHD, that more than 50% of the respondents do not know that the child's symptoms must have been present before age 7 and that defiant behaviour forms part of ADHD. These responses by the teachers show a lack of knowledge about diagnosis. Recognizing the primary symptoms is not sufficient to make a referral.

Scores on the items on the *general knowledge* subscale that contained information about the nature, causes and course of ADHD, and the *treatment* subscale which contained information on intervention were significantly lower than on the *symptoms/diagnosis* subscale. According to Pfiffner and Barkley (in Barkley,

1998:459) it will be difficult to establish behaviour management programmes within the classroom if teachers have a poor grasp of the nature, cause, outcome and treatment of ADHD (Pfiffner & Barkley, 1998:459). These results suggest that future educational interventions should focus not just on the symptoms, but also on other characteristics of ADHD (Sciutto *et al*., 2000:121).

These results address the following hypotheses that were postulated in Chapter 1.

> Hypothesis 5**:** There will be significant differences between the mean percentages for *correct* responses on the symptoms/diagnosis subscale, the general knowledge subscale and the treatment subscale.
>
> For *correct* responses, comparison of the mean percentages by subscale indicated a significant difference among the three subscales (F = 140,55, p<0,001).
>
> Hypothesis 6: There will be significant differences between the mean percentages for *don't know* responses on the symptoms/diagnosis subscale, the general knowledge subscale and the treatment subscale.
>
> For *don't know* responses, comparison of the mean percentages by subscale (see Table 4.4) indicated a significant difference among the three subscales (F = 427.15, p<0.001; see Table 4.5).
>
> Hypothesis 7: There will be significant differences between the mean percentages for *incorrect* responses on the symptoms/ diagnosis subscale, the general knowledge subscale and the treatment subscale.
>
> For *incorrect* responses, comparison of the mean percentages by subscale indicated a significant difference among the three subscales (F = 306.25, p<0.001).

Hypotheses 5, 6 and 7 were supported by the findings of this study.

4.4 DEMOGRAPHIC CHARACTERISTICS RELEVANT TO TEACHERS' KNOWLEDGE AND MISPERCEPTIONS OF ADHD

A series of Pearson correlations (α = .05, two tailed) were used to identify possible relationships between teachers' knowledge of ADHD and their background characteristics. The results of these correlations are presented in Table 4.6.

The *overall knowledge of ADHD*, as measured by KADDS, was unrelated to the *age of the teachers*, as well as to the *years of general teaching experience* they have p> 0.05 in both cases). The nonsignificant relationship between *overall knowledge of ADHD* and *general teaching experience* supports the findings of Kos *et al*. (2004:523) in their study of Australian teachers, but differs from the findings of Sciutto *et al*. (2000:120), indicating that teachers in the United States with more *years of teaching experience* obtained higher scores than teachers with *less teaching experience*.

Teachers' *confidence in their ability to teach* a child with ADHD *effectively* was found to relate positively with the *overall knowledge of ADHD*, as measured by the KADDS (r = 0.43, p < 0.05). *Overall knowledge of AD*HD was also positively related to *teachers exposure to ADHD* as childhood disorder. This exposure mentioned here was *teaching a child with ADHD* (r = 0.33, p < 0.05), the *number of workshops on ADHD attended* (r = 0.36, p < 0.05), *the reading of articles/papers on ADHD* (r = 0.49, p < 0.05), the *number of children they have referred for assessment* (r = 0.29 , p < 005) and their involvement in *assessing the efficacy of stimulant medication* (r = 0.25, p < 0.05). There were also small, but statistically significant correlations between KADDS *total scores* and the *educational level* of the teachers (r = 0.10, p < 0.05) and the *number of hours that were allocated to ADHD* in their initial training as a teacher (r = 0.18, p < 0.05).

The findings that confidence in their ability to effectively teach a child with ADHD and prior exposure to a child with ADHD was positively related to the overall knowledge of the teachers support the findings of the present study of (Sciutto *et al*., 2000:120). In the study that was done by Kos *et al*. (2004:524) additional ADHD training and experience with teaching children with ADHD were significantly associated with teachers' knowledge about ADHD. These findings support the findings of the present study, as well as the findings of Sciutto *et al*. (2000).

Table 4.6 Correlations between KADDS total correct scores and teachers' demographic characteristics

Variable	Statistical parameter	KADDS Total correct	Age of teacher	Teaching experienc	Educ Level	ADHD (hours) included in training	Referrals Made	Children Taught with ADHD	Assessing use of medicatio	Articles read on ADHD	Work-shops on ADHD Attended	Confidence to teach ADHD child
KADDS Total correct	**R**	1,00*	-0,01	-0,04	*0,10*	*0,18*	*0,30*	*0,33*	*0,25*	*0,49*	*0,36*	*0,43*
	P	----	0,82	0,43	*0,04*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Age of Teacher	**R**	-0,01	1,00	*0,86*	*-0,15*	*-0,26*	*0,16*	*0,17*	*0,12*	-0,02	-0,06	0,01
	P	0,82	----	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,02*	0,64	0,23	0,87
Teaching Experience	**R**	-0,04	*0,86*	1,00	*-0,19*	*-0,21*	*0,10*	*0,12*	0,09	-0,06	-0,05	-0,01
	P	0,43	*0,00*	----	*0,00*	*0,00*	*0,04*	*0,02*	0,05	0,26	0,32	0,82
Educational Level	**R**	*0,10*	*-0,15*	*-0,19*	1,00	0,07	0,06	*0,10*	0,02	*0,14*	0,06	0,03
	P	*0,04*	*0,00*	*0,00*	----	0,17	0,21	*0,04*	0,69	*0,01*	0,18	0,51
ADHD (hours) included in training	**R**	*0,18*	*-0,26*	*-0,21*	0,07	1,00	0,06	0,07	0,04	*0,36*	*0,24*	*0,27*
	P	*0,00*	*0,00*	*0,00*	0,17	----	0,21	0,15	0,42	*0,00*	*0,00*	*0,00*
Referrals made	**R**	*0,29*	*0,16*	*0,10*	0,06	0,06	1,00	*0,77*	*0,78*	*0,39*	*0,32*	*0,21*
	P	*0,00*	*0,00*	*0,04*	0,21	0,21	----	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Children taught with ADHD	**R**	*0,33*	*0,18*	*0,12*	*0,10*	0,07	*0,77*	1,00	*0,72*	*0,41*	*0,34*	*0,27*
	P	*0,00*	*0,00*	*0,02*	*0,04*	0,15	*0,00*	----	*0,00*	*0,00*	*0,00*	*0,00*
Assessing use of medication	**R**	*0,25*	*0,12*	0,09	0,02	0,04	*0,78*	*0,72*	1,00	*0,36*	*0,27*	*0,18*
	P	*0,00*	*0,02*	0,05	0,69	0,42	*0,00*	*0,00*	----	*0,00*	*0,00*	*0,00*
Articels read	**R**	*0,49*	-0,02	-0,06	*0,14*	*0,36*	*0,39*	*0,41*	*0,36*	1,00	*0,57*	*0,50*
	P	*0,00*	0,64	0,26	*0,01*	*0,00*	*0,00*	*0,00*	*0,00*	----	*0,00*	*0,00*
Workshops on ADHD attend	**r**	*0,36*	-0,06	-0,05	0,06	*0,24*	*0,32*	*0,34*	*0,27*	*0,57*	1,00	*0,41*
	p	*0,00*	0,23	0,32	0,18	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	----	*0,00*
Confidence to teach ADHD child	**R**	*0,43*	0,01	-0,01	0,03	*0,27*	*0,21*	*0,27*	*0,18*	*0,50*	*0,41*	1,00
	P	*0,00*	0,87	0,82	0,51	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	----

N = 522

Correlation coefficients marked in italics are significant at $p < 0,05$

4.5 CONCLUDING INTERPRETATIONS

In this study the knowledge and perceptions of primary school teachers in the periphery of the Cape Metropole were examined by using the Knowledge of Attention Deficit Disorders Scale (KADDS). Analysis of individual KADDS questions differentiated between a lack of knowledge and incorrect beliefs. The results suggest that there is a substantial lack of knowledge of ADHD among teachers.

Teachers' knowledge and misperceptions of ADHD were also examined within three specific content areas or knowledge domains: *symptoms/diagnosis*, *general knowledge* (e.g., prevalence, course, cause and outcome) and *treatment* of ADHD. The results of this study suggest that teachers are most knowledgeable about *symptoms/diagnosis*, as opposed to *treatment* and *general knowledge*. Although the performance of respondents was better on the *symptoms/diagnosis* subscale, the overall knowledge of ADHD was poor (42.6% on KADDS). Identifying teacher's knowledge and perceptions within these broader areas could lead to more effective planning and evaluation of educational interventions.

In the study overall knowledge was related to teachers' self-efficacy and exposure to ADHD as childhood disorder (e.g., teaching a child with ADHD, attending workshops on ADHD, extra reading about this disorder, assessment of medication and the number of hours allocated to ADHD in their initial training as a teacher). General teaching experience was not significantly related to knowledge of ADHD.

In Chapter 5 the conclusions that can be drawn from these results will be summarised. Thereafter recommendations on ways of addressing the problems that have been identified and on for future research will be made.

Chapter 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY

With inclusive education becoming a reality in South Africa, teachers will have to cope with more learners in their classes and with more learners with diverse problems, such as ADHD, which affects about 5% of all learners. As stated in **Chapter 1**, the objectives of this study were to investigate teachers' overall actual knowledge and misperceptions of ADHD, to look at teachers' knowledge within three specific content areas: symptoms/diagnosis of ADHD, *general knowledge* about the nature, causes and outcome of ADHD and the *treatment* of ADHD, and to investigate possible correlations between teachers' knowledge and various background characteristics. In **Chapter 2** a literature review was undertaken to identify main aspects of ADHD with specific emphasis on the management of ADHD in education. This overview of the literature highlighted the seriousness of ADHD, arguing that appropriate knowledge of this disorder is necessary in order to address the needs of learners in the classrooms of our schools. The diagnostic process was discussed and the referral and informational role of the teacher in this diagnostic process was outlined. A large percentage of children with ADHD face long-term risks. The important role of the teacher in the treatment process to create an environment conducive for an academic, social and emotional success for these children was also highlighted. **Chapter 3** described the research design and methodology, the research process and the instrument that was used. The demographic characteristics of the respondents were also presented and discussed. In **Chapter 4** the results of the survey were presented and discussed. Although teachers showed a higher degree of knowledge about the *symptoms and diagnosis* than about the *treatment* or *general* aspects (cause, nature and outcome) of this disorder, there seems to be a significant lack of knowledge about ADHD among teachers in the periphery of the Cape Town Metropole area. Teachers' actual knowledge correlated positively with their exposure to ADHD as disorder. Hypotheses 1, 3, 4, 5, 6 and 7 as postulated in Chapter 1 were supported by the findings of this study. Hypothesis 2 was not supported by the findings of the study.

5.2 CONCLUSIONS

The purpose of this study was to investigate teachers' knowledge and misperceptions of ADHD. A questionnaire was used to examine their actual knowledge as well as their perceived knowledge. This was done by analysing the responses to the individual questions, as well as analysing the responses in the specific content areas mentioned. It was found that the overall knowledge of ADHD of primary school teachers who took part in the study is low. This is a matter of concern since teachers play a pivotal role in the recognition, referral and treatment of ADHD.

Teachers indicated that they had very little or no training in ADHD and the management of this disorder in the classroom. The knowledge that the teachers have seems to have been gained from teaching children with ADHD, through attending workshops on ADHD and through reading scientific material on this matter. This is evident in the positive correlation between the teachers' actual knowledge of this disorder and these factors in the present study. It seems that teachers also acquired some of their knowledge through what is portrayed about ADHD in media reports. The knowledge that the teachers acquire this way is often incorrect and not based on scientific research. This conclusion is supported by the International Consensus Statement (2002), which was specifically addressed to the press by a Consortium of International Scientists, which expresses concern about the periodically inaccurate portrayal of ADHD in media reports. These scientists expressed their concern that because of inaccurate stories and information, thousands of people suffer as a result of not getting the right information or treatment. Their inaccurate information about this serious disorder often leads to teachers to make inaccurate referrals, give wrong advice to parents and fail to address this disorder effectively in the classroom.

In the present study two types of knowledge were highlighted: actual knowledge of ADHD and misperceptions (concepts teachers believe incorrectly). Studies (Sciutto *et al*., 2000:121; Kos *et al*., 2004:519) show that when people believe they are knowledgeable about a certain topic, it is unlikely that they will seek information on that topic. This may have important implications for educational interventions and addressing the lack of knowledge among teachers.

Furthermore, very few teachers indicated that they had ever been involved in assessing the use of stimulant medication. This suggests, as is also found in the literature (Jerome *et al*., 1994:563; Livingston, Ken, 1997:7; Schlozman & Scholzman, 2000:28), that the psychologist/medical practitioner does not have sufficient contact with the classroom teachers of children with ADHD,. A closer working relationship between classroom teachers and psychologist/medical practitioner would be likely to enhance the diagnostic process, and to improve the efficacy of medication management, as well as the treatment process.

Firm conclusions can be extrapolated to the general teaching population since the large sample was drawn from a diverse teaching population from different areas, the feedback was very high and the evidence is extensive. The study suggests short comings in teacher training practices, as well as in the diagnostic and treatment process where psychologists/medical practitioners, together with the teachers should be involved.

The main value of this study was identifying areas where there is a lack of knowledge among teachers and suggesting ways of providing support and the necessary knowledge in a constructive way.

5.3 RECOMMENDATIONS

In the light of the results of this study the following recommendations are made:

5.3.1 Recommendations regarding teachers:

5.3.1.1 Teachers should be offered in-service training in ADHD, as well as in behavioural management and academic interventions (curriculum adaptations) with regard to children with ADHD;

5.3.1.2 The training of in-service teachers should be supplemented with ongoing consultation or support (collaboration with educational psychologists);

5.3.1.3 Pre-service teachers should receive training in ADHD, as well as training in behavioural management and academic intervention (curriculum adaptations) with regard to children with ADHD. Pre-service teachers should also be given the opportunity to work with ADHD learners during their practical teaching, so they can apply of their newly learned skills and strategies. This recommendation follows from the results that were obtained in this study (Section 4.4) and the study by Sciutto (2000) that teachers' actual knowledge is related to exposure of children with ADHD.

5.3.1.4 During the training of pre-service and in-service teachers the focus should also fall on the importance of communication between the teacher and the psychologist/medical practitioner, including the type and format of information needed by these professional people to make a diagnosis and to establish treatment goals and targets for intervention.

5.3.2 Recommendations regarding the role of outside professionals:

5.3.2.1 A closer working relationship between outside professionals (e.g. educational psychologists, pediatricians) and classroom teachers is encouraged. This could reduce the incidence of misdiagnosis, improve the efficacy of medication management and increase the knowledge base of the teachers.

5.3.2.2 The training of educational psychologists should focus on the various stages of the diagnostic process (as described in the literature review, Section 2.3.3.2) and on working together with the classroom teacher who plays an important role in the identification and management of children with ADHD.

5.3.3 Recommendations regarding the role of parents:

5.3.3.1 Parent management training should focus on promoting prosocial and self-regulating behavior, managing disruptive child behavior at home and reducing parent-child conflict

5.3.3.2 Teachers should be encouraged to involve the parents in the learning process of their children

5.3.4 Development of an ADHD centre:

- In the light of the results of this study, it is recommended that an ADHD centre be developed at the University of Stellenbosch with an emphasis on eco-systemic values such as cooperation, support and alliance. At such a centre the latest research on ADHD should be available to lecturers, psychologists, teachers, students and the community. *"Scientists' understanding of the nature of ADHD is incomplete, and implications for diagnosis and treatment are emerging continually. Because teachers are often the first ones to recognize the symptoms of ADHD, it is essential for them to draw upon a current and accurate knowledge base as they interact with parents, physicians, and other professionals".* (Snider *et.al*., 2003:48). This centre can serve as a place where continued training of teachers is offered. Training of parents in the management of children with ADHD to enhance effective learning and development can be conducted here.

- This centre should encourage research by master's students which could lead to better management of ADHD on all levels.

- The ADHD centre could develop a training package for in-service teachers that could be used in workshops in different centres.

5.3.5 Recommendations for further research

5.3.5.1 To address the lack of knowledge and misperceptions of teachers, the training content of colleges and universities in terms of *general information*, *symptoms/diagnosis* and *treatment* information presented in textbooks, assigned readings and instructional materials should be well researched and validated to address teachers' level of understanding.

5.3.5.2 There should be an investigation into teachers' attitudes, school policies and resources, as well as the relationship between these variables and teachers' behaviour to gain a better understanding of the impact of ADHD across our education system.

5.3.5.3 A research project should be undertaken to gauge the effect learners with ADHD have on the rest of the class.

5.4 FINAL WORD

During the research process the researcher became very aware of the lack of appropriate knowledge among headmasters and teachers. An awareness of ADHD was raised among teachers when they completed the questionnaire, but was not followed up by adequate knowledge or feedback at the time. In response to requests from many principals, thorough-going feedback will be given to the schools once the study has been completed.

Development of a training package for the diverse South African population presents special challenges, particularly in the light of the varying needs of teachers. Some teachers have already developed very good strategies in working with learners with ADHD, while others have very little or even no knowledge of ADHD.

We have a responsibility towards our children to make sure that teachers are knowledgeable about ADHD and be in a position to offer support to children so they can manage their behaviour and achieve success both socially and academically. According to the Education White Paper of the Department of Education (2001:17), "Inclusion is about supporting all learners, educators and the system as a whole so that the full range of learning needs can be met. The focus is on teaching and learning actors, with the emphasis on the development of good teaching strategies that will be of benefit to all learners".

> *"What will be required of us all is persistence, commitment, co-ordination, support, monitoring, evaluation, follow-up and leadership" (Education White Paper 6,2001:4).*

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