Perceptions and Understanding of Attention Deficit Hyperactivity Disorder amongst Foundation Phase Teachers at Independent Schools in Johannesburg

Tamara Jaye

A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Science in Medicine in Child Health (Neurodevelopment)

Johannesburg, 2019

DECLARATION

I, Tamara Jaye, declare that this research is my own work. It is being submitted for the degree of Master of Science in Medicine in Child Health (Neurodevelopment) at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

Signature _____

On this _____ day of _____

DEDICATION

This thesis is for my daughter Rachel.

No course could ever teach me as much as I've learnt from you. May you continue to always see the world as interesting and magical and exciting! We can all learn so much from your ongoing thirst to acquire new knowledge. Rachey, I love your gentle nature, your clever sense of humour, and your individuality – continue to always be true to yourself. I love you

ABSTRACT

Attention Deficit Hyperactivity Disorder (ADHD) is a common neurodevelopmental condition comprising hyperactivity, inattention, and impulsivity. It is pervasive across various settings and leads to functional impairment, with the diagnosis of this condition increasing significantly over the past two decades.

The classroom is a difficult environment for the child with ADHD as the symptoms of the condition hinder behaviour that is required in a school setting. Teachers play a crucial role in this condition, being expected to notice the signs of ADHD, be a collateral in the diagnosis, manage the child's behaviour in class, and administer medication.

This study was to determine Independent School Foundation Phase teachers' knowledge and perceptions of the symptoms, associated features and treatment of children diagnosed with ADHD. A quantitative approach with a cross-sectional research design was used to conduct the study. A demographic survey, followed by a self- administered questionnaire called the Knowledge of Attention-Deficit Disorder Scale (KADDS) was utilised for a sample of 95 teachers at 9 independent schools in Johannesburg. In addition, a focus group was conducted with several candidates using open-ended questions.

The results showed that this group of teachers attained the highest score compared to other research bodies where the KADDS was utilized. The majority of Independent teachers are knowledgeable about the symptoms of ADHD, less so about ADHD treatment, and features of ADHD are poorly understood. Experience with children with ADHD in their classroom correlated with more ADHD knowledge. Workshop attendance and reading material on ADHD were shown to improve knowledge and perceptions about ADHD amongst teachers.

ACKNOWLEDGEMENTS

I wish to acknowledge the following people for the roles that they have played in ensuring the completion of this report:

- Dr Sheri Hanson, thanks for accepting my outlandish request to supervise my thesis. As if you had any extra time to squeeze one more thing into your day, you took on supervising my thesis wholeheartedly, and you have made this Masters experience so worthwhile and enjoyable for me. Thanks for all the time you've spent on my thesis, thanks for the regular meetings and chats, and thanks for your friendship.

- My husband Cecil, thanks for our beautiful life and our happy home. Thanks for all your help with this course, thanks for all the time you spent on making sense of the stats and explaining them to me, and thanks for taking on just about everything else so I was able to study! You have supported and encouraged me every step of the way with each career decision I've taken and every course I've embarked on. Thank you. I love you

- My younger daughters Rebecca and Gabriella
  Becs, of all your wonderful qualities, your deep kindness and empathy for others are what I admire the most. You are such a source of pride to us, and I feel so blessed to be your mom and be able to see what an outstanding human being you are growing up to be. Gabs, you fill our lives and our hearts with so much happiness and laughter. Your beautiful smile, your funny comments, your lovable nature, and your overall cuteness provide me with endless joy. You are a true blessing to our family.

- My parents Mel and Judy, and my siblings, Jocelyn and Gary.
  We were brought up in a home where the importance of education was continually emphasized and modelled. I have always felt encouraged to accept challenges, to further myself, and I have felt continuously supported and cheered on by you all in everything that I do. Thank you!

- The principals and the teachers who so willingly participated in this study.
  I graciously thank you for the time you took to fill out the questionnaires. To those ladies in the focus group – thank you for your insights that have added so much to my research. Your pupils and their families are lucky to have principals and teachers who are genuinely interested in helping their students and who are so eager to continue learning.

- Dr Jacob Majakwara, thank you for your help with my statistics. I appreciate all the time and effort that you put it into this, and I am truly grateful.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AAP American Academy of Paediatrics

ADHASA The ADHD Society of South Africa

ADHD Attention Deficit and Hyperactivity Disorder

DSM 4 Diagnostic and Statistical Manual of Mental Disorders 4th Edition

DSM 5 Diagnostic and Statistical Manual of Mental Disorders 5th Edition

FDA Food and Drug Administration

KADDS The Knowledge of Attention Deficit Disorder Scale

MTA The Multimodal Treatment for Attention Deficit and Hyperactivity Disorder

NEJM The New England Journal of Medicine

NICE The National Institute for Health and Care Excellence

CHAPTER 1

INTRODUCTION

Attention Deficit Hyperactivity Disorder is fraught with misperceptions, specifically those relating to the nature, causes and management of the condition. This is evident in both mainstream media, as well as within the medical profession (1). These aspects of ADHD are continually debated, with new guidelines aimed at doctors, carers and family members being revised on a regular basis (2).

The role of the educator in relation to ADHD is clearly outlined in the most recent National Institute for Health and Care Excellence guideline (3). According to the guideline, it is the responsibility of the Department of Education to train teacher trainees on how to supervise children with ADHD in the classroom, emphasizing the fact that school teachers are often expected to play a role in the management of a child with ADHD (3). Whilst the South African education guidelines do not specifically mention ADHD, they do include all children with any barriers to learning stating: "All children and youth can learn and need support, and that learners' individual strengths need to be encouraged" (4). Teachers may be required to function as a collateral in an ADHD diagnosis. They are, in many cases, the first to be aware of a behavioural problem in the classroom setting, and they are sometimes even responsible for dispensing medication at school (5).

The prevalence of ADHD worldwide is currently estimated to be 5% (6). Diagnosis is made more commonly during the early primary school years as compared to pre-primary school, as the primary school environment is far more structured with children being required to sit still and concentrate for longer periods of time (7).The Foundation Phase is often the time when ADHD becomes more evident. Children are expected to perform more desk-top learning time with less playtime, utilise their fine motor skills, and remain focused on one task. The inattention and hyperactivity, characteristic of ADHD, seem to appear when the children are required to remain seated in front of a teacher, and exhibit a certain level of attention (8). Thus, it is

common for Foundation Phase teachers to be exposed to pupils with a diagnosis, or a possible diagnosis, of ADHD.

Many teachers are of the opinion that they have not been sufficiently trained on the topic of ADHD (5)(9). A recent poll in the UK showed that teachers invest a great deal of effort into improving the future for children with ADHD, however they are unequipped to provide the appropriate support. The majority of teachers in the poll said they lack the knowledge, the skills, as well as the confidence, to help these pupils (2). A South African study using both public and private school teachers concluded that both these sets of teachers' understanding of ADHD was limited to behaviour that they observed, and they lacked knowledge about causes and treatment options for ADHD (8). Research amongst teachers working in a township in Alexandra, Johannesburg found that more than half these teachers lacked the confidence to teach children with ADHD (10).

In an international study looking at teachers' knowledge and perceptions of ADHD in 9 different countries, teachers' overall knowledge about ADHD was found to be modest (11). This was associated with lack of training on the topic of ADHD (12). There is a paucity of studies on this topic in the South African context, but the few studies that have been conducted have reflected similar results. Perold found that teachers' understanding of ADHD is limited to the behaviour these children display, and causal factors for ADHD are not well-understood (12).

This study looked specifically at Independent School Foundation Phase teachers in Johannesburg. This differs from other South African studies in that previous South African studies have examined the public sector, or compared independent school teachers' knowledge to that of teachers in the public-school system in the same geographical area. The research tool utilised was the KADDS, a well validated ADHD scale designed by Professor M. Sciutto in Massachusetts, which examines ADHD incidence rates, causes and appropriate interventions (11). In addition, focus groups

were conducted after the initial questionnaire using open-ended questions to gain more insight into teachers' knowledge about ADHD.

1 Research questions, aims and objectives

1.1 Research question

What is the knowledge and perceptions of Independent Schools' Foundation Phase teachers regarding the presentation and diagnosis of ADHD, and the available treatment modalities?

1.2 Research aim

To evaluate Foundation Phase teacher perceptions and understanding of ADHD in Independent Schools in Johannesburg

1.3 Research objectives

To determine:

1. Teachers' perceptions surrounding general information about ADHD
2. Teachers' knowledge about how ADHD presents and how a diagnosis is made
3. Teachers' perceptions about treatment modalities for ADHD

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter will explore ADHD, and specifically examine the different causes of the disorder, the features of ADHD as well as the available treatment modalities including both psychotherapeutic options and medication. Co-morbidities of ADHD will also be discussed. This chapter concludes with a summary of similar research that looked at teachers' perception and understanding of ADHD both locally and globally.

2.2 Attention Deficit Hyperactivity Disorder

This disorder is a common neurodevelopmental condition comprising hyperactivity, inattention, and impulsivity. It is pervasive across various settings and leads to functional impairment (13). Initially this disorder was described in the DSM II as Hyperkinetic Reaction of Childhood (14) focusing specifically on excessive motor activity, and only in the 4th Edition were the features of impulsivity and inattention incorporated into the definition (14). The DSM 5 has further expanded the diagnosis to now include adolescents and adults, patients with co-morbid Autism Spectrum Disorder, and those are who have a reduced quality of life due to ADHD as opposed to the previous definition of being "functionally impaired'' as a result of the condition (13). In terms of diagnosis of ADHD, symptoms needed to be present before the age of 7 years in the DSM IV. The DSM 5 has changed and now says that ADHD symptoms should present before the age of 12 years (13). ADHD is listed in the category of *neurodevelopmental disorders* rather than the category of *disorders first diagnosed in infancy, childhood or adolescence*, reflecting that brain development correlates with the disorder (15).

ADHD affects a person's day-to-day functioning, and is associated with significant costs due to increased health care needs, higher rates of unintentional injury and co-morbid illness (16). ADHD has been reconceptualised as no longer a disorder (17)

that only affects children, but as one that persists into adulthood (18). Thus, these challenges continue into all stages of life.

2.3 Origins of ADHD

ADHD is not a new disorder. Despite television and screen time being used as the main scapegoats for causing ADHD (19) - and not consistently proven to be so (20) – this disorder has existed long before their presence.

Today we hear about the “ADHD-success stories” of public figures such as Sir Richard Branson, Jim Carey, Michael Phelps and Justin Timberlake (17) . However, their hyperactive behaviour is not novel to the 21st century. Biblical characters Esau, Samson and Saul seemed to display ADHD features, primarily executive dysfunction (21). Shakespeare, in Henry VIII, which was written in 1613, described one of his characters as having a ‘malady of attention’ (22).

ADHD has been documented in medical journals from the last quarter of the 18th century prior to television or any source of screen time (23), and attributed to an exuberance of youth or a child lacking appropriate discipline or intellectual capacity. The DSM III, published in 1952, coined the term Attention Deficit Disorder with and without Hyperactivity.

2.4 Core symptoms

According to the DSM 5, for a child to be diagnosed with Attention Deficit Hyperactivity Disorder there needs to be a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development. This pattern needs to persist for at least 6 months and interfere with level of function or development (13). Symptoms should be present before the age of 12 and be evident

in at least two settings (13).
There are three ADHD sub-types:

1) ADHD/Combined Type
2) ADHD/Predominantly Inattentive Type
3) ADHD/Predominantly Hyperactive- Impulsive Type.

In the predominantly inattentive group, at least six symptoms of inattention need to be present up to the age of 16. In adults or adolescents older than 17 years of age, 5 symptoms need to be present. These are listed as follows in the DSM 5:

- Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or with other activities.
- Often has trouble holding attention on tasks or play activities.
- Often does not seem to listen when spoken to directly.
- Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (e.g., loses focus, side-tracked).
- Often has trouble organizing tasks and activities.
- Often avoids, dislikes, or is reluctant to do tasks that require mental effort over a long period of time (such as schoolwork or homework).
- Often loses things necessary for tasks and activities (e.g. school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile telephones).
- Is often easily distracted
- Is often forgetful in daily activities.

In the hyperactivity and impulsivity group, once again, 6 symptoms must be present in children up to the age of 16, and 5 or more symptoms for adolescents older than 17 and adults. The symptoms are listed in the DSM 5 as follows:

- Often fidgets with or taps hands or feet, or squirms in seat.
- Often leaves seat in situations when remaining seated is expected.
- Often runs about or climbs in situations where it is not appropriate (adolescents or adults may be limited to feeling restless).

- Often unable to play or take part in leisure activities quietly.
- Is often "on the go" acting as if "driven by a motor".
- Often talks excessively.
- Often blurts out an answer before a question has been completed.
- Often has trouble waiting his/her turn.
- Often interrupts or intrudes on others (e.g., butts into conversations or games)

2.5 Prevalence of ADHD

ADHD has increased in prevalence over the past two decades (24) with more school-age children being diagnosed with ADHD now compared to twenty years ago (25). Internationally, statistics show differences in ADHD population figures ranging from 3.4% to 7.2% (26)(27). Reasons for these statistical discrepancies may be due to the fact that an ADHD diagnosis is only based on observable behaviour as there are no cognitive, metabolic or neurological markers for ADHD (28)(29). ADHASA (the ADHD Society of South Africa) reports that the current prevalence of ADHD amongst the South African population is 8 – 10%. In Perold's research, South African statistics for ADHD were estimated to be 5% of the population, with school aged children making up 1 to 2% of this figure (12). Large variability in the prevalence may be due to the methodological variables that are utilized such as the source of information, diagnostic criteria and impairment criterion (34). A metanalysis of the literature showed that there was little difference found across countries or different regions in the world with regards to ADHD (30). Culture too, has been found to play no role in ADHD prevalence rates, and ADHD is uniform across different ethnic groups (31).

Furthermore, the prevalence of ADHD was very similar when different methods were instituted to make an ADHD diagnosis. For example, when the DSM IV criteria were used as defined by parent rating, teachers rating or best estimate diagnostic procedures, prevalence rates were not markedly different (30).

Explanations for the increasing prevalence in ADHD may be due to factors at school such as changes in the classroom environment or the increasing pressure that is put on school-going children which may lead to behaviours that mimic ADHD (32). Further reasons for the high prevalence rates of ADHD may be due to inappropriate diagnosis for example other psychiatric illnesses such as anxiety and depression, which both may present with difficulty sustaining attention (33). Reactive Attachment Disorder, classified in the DSM 5 under Trauma and Stress-Related disorders, shares some symptoms that are seen in ADHD so may also be misdiagnosed as ADHD (34).

Terminology adjustments may impact on higher prevalence rates being observed currently (34). Greater physician awareness too has an impact on more ADHD diagnoses being made (35), as well as increased parental acceptance about the condition (35).

2.6 Aetiology

There is much complexity surrounding the causes of ADHD. The substantial increase in ADHD prevalence may be due to aetiological causes, however further studies are warranted as the possible causes are diverse (36).

ADHD is similar to other psychiatric and developmental disorders in that epigenetic mechanisms play a role in disease manifestation (34). The genetic code remains unchanged, however gene expression is modified, and this results in the clinical picture of ADHD. It is a complicated sequential pathway which involves genetic, environmental and protective factors that each play their role in the disease development (50).

Genetic studies show that there is a strong hereditary contribution towards the disorder (38). The heritable component is estimated to be close to 80% (39).

Pharmacogenetics, the study of inherited genetic traits in drug metabolism resulting in clinical drug responses, both therapeutic and adverse, is undergoing immense research currently (38). Although strides are being made, there is insufficient evidence to prove its role in the diagnosis of ADHD, and thus at this stage it should not be used to make an ADHD diagnosis. This is largely due to the fact that there have not been enough studies to perform metanalyses (40). The FDA in April 2019 issued a statement stating that pharmacogenetic testing should not be used to adjust or cease any ADHD medication at this stage of the research (41) .

Environmental factors have also been found to play a part in contributing to ADHD. These include perinatal factors, maternal health, toxin exposure and parenting styles.

Prematurity (42), low birth weight (42), cigarette smoking and drugs or medications used in pregnancy have been implicated as causes for ADHD (43). A large Norwegian study examined the entire Norway population over a 45-year period and found a possible association between ADHD and mothers suffering from autoimmune diseases such as Diabetes Mellitus type 1, hypothyroidism, multiple sclerosis, rheumatoid arthritis and asthma. These children had higher rates of ADHD as compared to the rest of the population. As ADHD is most likely due to multiple factors, this study concluded that maternal disease may impact on foetal development in a number of ways including genetic factors, through environmental aetiologies, or via a maladapted foetal immune response, resulting in offspring with ADHD (44). A Swedish study examined hypothyroidism on its own, and observed a modest association between maternal hypothyroidism in early pregnancy and an increased risk for ADHD symptoms in children by age 8 years. This was independent of confounding factors (45). Another Swedish study found an association between ADHD and Polycystic Ovarian Syndrome (46). The hypothesis is most likely due to sex hormones influencing neurodevelopment.

Poor parental attachment has been implicated in ADHD, particularly a disorganised attachment (47). Poor parenting style too, has been postulated as a cause of ADHD

(48) however other studies suggest that the quality of parenting is unlikely to be a primary cause of ADHD, rather it is among several postnatal environmental risk factors that may influence impairment of the disorder (49). Maternal sleep disorders, anxiety and clinical depression prior to and during pregnancy were all associated with higher rates of ADHD in offspring in a large trial of 3 600 patients from the Italian NINFEA cohort in 2018 (50).

Exposure to toxins such as lead and organophosphates during the perinatal period may be a cause of ADHD, and deficiencies in zinc, magnesium or polyunsaturated fats may also result in this disorder (51). Multiple anaesthetic procedures in very young children too have been implicated in higher ADHD and learning disability rates. The association was stronger following multiple anaesthetics as compared to a single exposure. This study was performed on 3 different occasions at the Mayo Clinic, with similar results each time (52).

The influence of diet on ADHD is controversial. Food colourants and additives are often perceived by parents as causing ADHD or impacting on behaviour. Clinically, this has not proven significant. Eight trials on food additives provided sufficient data to create for a meta-analysis. Each of these trials excluded certain food additives, preservatives or tartrazine. Based on Connors Teacher and Parent Rating Scales, the results of these exclusionary diets made little difference to children’s ADHD behaviour (53). Current international guidelines do not recommend elimination diets as part of ADHD treatment (54)(55).

Maturational delay is a key feature of ADHD which has been confirmed on neuroimaging. Shaw confirmed that the maturational delay in ADHD children compared to their neurotypical peers was most prominent in the prefrontal regions, the areas of the brain that control cognitive processes such as motor planning (56).

2.7 Diagnosis

ADHD is highly heterogeneous in terms of symptom presentation, cognitive impact, and neurobiological causes, and genetic features (57). The diagnosis of ADHD is clinical, based on set criteria defined by diagnostic classification systems. Like other psychiatric conditions, in ADHD there is not one ancillary test that can be used to make a diagnosis (57). As with other psychiatric disorders, there are no phenotypic features that are observed in people who have ADHD (58).

The overall approach to diagnosing ADHD involves various components. These include a comprehensive interview with parents or caregivers of the child, as well as a mental status examination of the child (32). A basic medical examination should be done looking at both the child's general health as well as his neurological status (32). A cognitive assessment should be conducted looking at the child's abilities as well as his levels of achievement, and ADHD-focused parent and teacher rating scales can be used to aid the diagnosis (32). School reports may be helpful in making the diagnosis as well as certain case-specific adjunctive evaluations such as a speech and language assessments (32).

As an ADHD diagnosis is not reliant on a specific blood test or imaging technique, various subjective factors seem to play a role in a diagnosis being made. For example, parent-rating scales throughout the literature show that mothers are more likely to lean towards a diagnosis of ADHD than fathers (59). This may be in part due to the fact that mothers spend more time with their children than the fathers (60). Mothers may find the over-activity symptoms of ADHD more distressing than fathers whose attitude of 'boys will be boys' may minimise their concern (32). The implications of these differences in both attitude towards behaviour and diagnosis may ultimately impact on seeking medical help and initiating medication (60).

Gender may also influence an ADHD diagnosis. A study from the University of Basel suggested that a patient's gender may influence a diagnosis of ADHD considerably.

Vignettes were provided to child psychologists, psychiatrists and social workers. In the vignette displaying a stereotypical ADHD male child, the professionals diagnosed ADHD twice as much compared to the identical vignette using a female name (61).

Certain groups have been found to have a delayed ADHD diagnosis. In a large American study of 17 000 children, two thirds of minority groups received ADHD diagnoses later than their peers. This was consistent from nursery school until Grade 8 (62). Sayal (2006) found a discrepancy between parents opinions and those of teachers when it came to the core features of ADHD, often with teachers finding certain symptoms displayed as being concerning (6).

Different instruments used for ADHD screening and diagnosis have also been examined to see if these have an impact on an ADHD diagnosis (63). Four common ADHD tools were compared in a study by Posserud (2014) to see if a diagnosis was reached uniformly using the different tools. The findings concluded that tests did not always yield the same result, and the parent Development and Wellbeing Assessment (DAWBA) was superior as a screening tool (63).

2.8 Treatment options

Treatment for ADHD includes certain medication options as well as behavioural management techniques. In school-age children, most clinical guidelines internationally suggest a stepwise approach to ADHD management (49)(53). Non-pharmacological interventions are recommended as first-line therapy, and thereafter, if there is little clinical improvement, medication should be initiated (51). However, American guidelines recommend an individualised approach including pharmacotherapy, behavioural therapy, and psychosocial interventions if necessary. Parental training is of importance in nursery school aged children (55).

2.8.1 Behavioural management

A multimodal approach incorporating both medical and behavioural interventions has been found to be most effective in ADHD management (57). The Multimodal Treatment Study of Children with ADHD (MTA) looked at treatment options for children with ADHD, children with ADHD as well as anxiety, and those with ADHD together with Oppositional Defiant Disorder. These children were divided into 4 groups and followed up for 14 months. There was a group who received medical management, a group who received behavioural management techniques, a group who received a combination of the behavioural and medical management, and a community-care group who received whatever treatments and therapies were recommended and available within their community. The behavioural interventions in the community care group were far less intensive and the medication, usually stimulants, was not administered as often as in the treatment group. The results illustrated that the group receiving a combination of the pharmacotherapy and the medication did the best in terms of ADHD symptoms, although the group who only received medication had a very similar response. The community care and behavioural groups had the least success (64). The combination group was superior to the other 3 groups in the domains of social skills, parent-child relationships, academics, anxiety, depression and oppositional behaviour (64).

In terms of behavioural therapy and ADHD, behavioural programs have been found to aid children in engaging in developmentally-appropriate family interactions, developing new skills, and being recognised and rewarded for positive behaviour (65). Improvement in both sports and social skills, as well as academic performance, have also been cited as positive outcomes following behavioural therapy (64) Children who have ADHD together with other co-morbidities are more likely to improve with this mode of therapy than those who have ADHD alone where behavioural therapy, without medication, was found to not be largely effective (66).

Physical exercise has been used as an adjunct in managing ADHD and a recent literature review explored this topic (67). The beneficial effects of cardiac exercise, both short-term and longstanding, were seen in many behavioural and cognitive

aspects of children with ADHD. These included speed of processing and flexibility (77). Working memory has also been found to improve with certain exercise training programs (74). Twenty-five children between the ages of 8 and 11 were put into two groups, one in which stimulant medication was administered, the other where a training program was instituted. The results showed that both groups had an improvement with their working memory, and the group that only had training had substantial gains in all components of working memory across a variety of tasks that were previously untrained (68). However these results have not been a consistent finding in other bodies of research (69) (70).

School programs and support may be useful for children with ADHD. Measures include preferential seating, modified work assignments, and test modifications such as location of the test as well as time constraints (71). Other interventional strategy options in the classroom that have been described include a daily report card where behavioural problems are written down, then assessed by the teacher, and a score is given every day based on this behaviour (79). Parents then reward the child based on this score. The response cost technique is another intervention used in the classroom where a child earns points for positive behaviour, and loses points for either negative or unruly behaviour (79). The classroom lottery, yet another technique, is similar to this but all the pupils in the class are involved, each gaining or losing points depending on the behaviour displayed in class. A comparison using these different strategies concluded that educators found the daily report card to be the most useful intervention (72).

Goode and Coeytaux (2018) examined 54 ADHD studies in which non-pharmacological methods were used to treat ADHD from 2009 until 2016. Such methods included omega fatty acid supplementation, neurofeedback, cognitive behavioural therapy, child and parent training, cognitive training and herbal and diet approaches. Effectiveness of these methods was limited when compared to pharmacological treatments (73).

Another meta-analyses and systemic review on non-pharmacological management of ADHD found a small yet statistical significance on ADHD symptoms when artificial food colourants were excluded from diet (53). This however may be limited to patients with food sensitivities (53).

2.8.2 Medical management

Pharmacotherapy, the medical treatment for ADHD, is efficacious, and the European Professional Consensus Group on ADHD, in fact, recommends it as the first line of treatment in severe cases of ADHD (74). The current recommendation is stimulant medication, methylphenidate or amphetamine, which have been found to be highly effective for most children in improving ADHD core symptom (80). However amphetamine is not available in South Africa (3).

Methylphenidate is available in a variety of formulations such as Methylphenidate SR (short-acting Ritalin), Methylphenidate LA (the long-acting Ritalin LA), methylphenidate OROS (Concerta) and methylphenidate MUPS (Contramyl). Ritalin SR comes in a 10mg tablet and lasts for approximately 4 hours. Ritalin LA is a capsule that contains methylphenidate in a long-acting form. It may be swallowed whole, or it may be opened and sprinkled on food and then eaten as recommended per the package insert (75). This medication should not be crushed (75). Ritalin LA contains beads within the capsule, 50% immediate-release and 50% modified release beads. The modified-release beads become effective after 4 hours following digestion (75). Ritalin LA lasts between 6 to 8 hours. Concerta, the longest acting form of methylphenidate, lasts 8 to 12 hours. It is composed of a hard shell which cannot be chewed or opened. It has a triple-release mechanism. The medicine is coated on the outside, and this layer takes 10 or 15 minutes to become effective. On the inside, there is a push compartment filled with a polymer fibre that expands like a sponge as it gets wet, and pushes out the medicine through a laser hole on one end. The capsule is not absorbed. The medication is made up of two compartments, 30% in the first compartment which is released initially, and thereafter 70% from the second compartment is released (3).

Several non-stimulant medications are available for the treatment of ADHD. These are often used due to side effects from stimulants that are intolerable to a patient such as the development of tic or mood disorders. Atomoxetine, Strattera, as well as adrenergic agonists extended-release guanfacine and extended-release clonidine have received FDA approval for ADHD treatment (55). Atomoxetine is a nonselective noradrenaline reuptake inhibitor that results in increased synaptic noradrenaline (76). It is the only non-stimulant currently available in South Africa. It should be taken whole and not opened as the pharmacodynamics of the medication require an intact capsule for the slow release component to work efficaciously for 24 hours (76).

A large trial demonstrated that Edivoxetine, a selective noradrenaline reuptake inhibitor, was successful for ADHD treatment (77). For certain patients who do not respond to stimulants, tricyclic antidepressants and bupropion have been found to be efficacious, and were superior to placebo (78). Bupropion, a dual norepinephrine and dopamine uptake inhibitor, has been prescribed for depression, as a smoking cessation medication, and it is used to treat ADHD off-label. It is recommended as fourth line medication in ADHD (79).

In terms of prescribing habits for ADHD, a cross-sectional study from 2005 until 2012 looked at ADHD drug trends in 5 countries from either national or regional data (86). Results showed that methylphenidate was prescribed more often in Europe, whereas amphetamines were used more commonly in the US. The USA had far greater numbers of children on medication, however this study showed that the other countries in the study had a greater increase in the number of children being prescribed the medication in 2012 as compared to 2006 (80).

Side effects of these drugs are common, with adverse events to the stimulants including headache, loss of appetite, abdominal pain and sleep disturbances (53). Hallucinations and psychotic episodes have also been reported (55) (3). Sudden cardiac death has been cited as a side effect of individuals taking ADHD medication (87). The European Guidelines conclude that although exceedingly rare, cardiac

incidents from ADHD medication have been reported (53)(81). Stimulants may also have effects on both blood pressure and heart rate (81). Growth disturbances from stimulant medication have been examined in various studies worldwide (88)(89). Results have shown that both height and weight decreased with treatment initiation with Ritalin or Adderall (an amphetamine). Weight in these children normalised within 3 years, however a decrease in height was found during treatment use, after treatment was stopped, or once adolescence was reached (82). Another study found that children on stimulants for ADHD had a lower Body Mass Index, and often had a poorer diet compared to those children not on stimulant medication (83).

An increase in tics as a reported side effect of ADHD stimulant medication is contentious amongst specialists (81). In patients with tic disorders, ADHD is commonly found in 50% of cases (90). In patients with ADHD, tic disorders co-exist in 20% (84). If tics are associated with stimulant usage, the current recommendation is to lower the dosage of the stimulant medicine or use an alternative therapy such as an anti-depressant or atomoxetine (3).

Atomoxetine has less side effects than methylphenidate, with the most common ones being abdominal pain, nausea and somnolence (76).

Parental concerns surrounding medication impacts greatly on ADHD treatment initiation (91). A study using best-worse case scenarios asked parents to fill in a questionnaire to elicit their major worries about the treatment and the reasons they felt treatment was necessary. From the survey, parents felt that the medication would control the ADHD behaviour, it would help their child become a successful adult, and the treatment would increase the likelihood that their child would finish school. However, the majority of parents who took the questionnaire expressed concern that the medication would affect their child in the long run, and that the side effects of the medication outweigh the benefits of it (85).

There has been significant concern that stimulant use is associated with substance abuse (92). A large sample of adolescent and adult patients with ADHD was examined, and results showed that ADHD medication was in fact associated with lower concurrent risk as well as lower long-term risks of substance abuse (86). These findings echoed those of the MTA study (64). ADHD medication too has been found to lower hospital visits, and treatment may even provide protection from criminal behaviour (87).

Psychostimulants such as methylphenidate are used by people without an ADHD diagnosis as a 'pharmaceutical cognitive enhancer' to improve their cognitive function (88). These drugs have been found to be helpful in improving academic performance, wakefulness and attention even in people without ADHD (89). Methylphenidate has been associated with increased use around exam periods primarily among university students who do not have an ADHD diagnosis (90).

2.9 Co-morbidities of ADHD

ADHD may be associated with high levels of anxiety, as well as low self-esteem (91)(92).The consequence of this is ADHD having the potential to affect academic performance from both a performance anxiety perspective as well as impacting on the social functioning of these individuals. Both these areas have been shown to improve with treatment (91). These findings suggest that children with ADHD should be regularly monitored so that symptoms of anxiety disorders are not missed (92).

Depression rates amongst children with ADHD is found to be higher than in the general population (93). In a Cardiff University study, 250 children with ADHD and their parents were asked to fill out a mood questionnaire. The rates of depression as measured from both the child and the parental questionnaires indicated that there are higher rates of depression symptoms such as irritability, restlessness and feeling miserable as compared to a population sample (93).

Several other co-morbidities of ADHD were highlighted in a South Africa study which looked at adolescents with ADHD (91). These included conduct disorder, oppositional defiant disorder, post-traumatic stress disorder, eating disturbances, suicidal tendencies, anger outbursts and interpersonal problems (94).

ADHD is not a disorder limited to childhood, it may persist into adulthood, and is associated with certain co-morbid illness and functional difficulties (95) (96) (97). It is a lifelong neurodevelopmental condition with two-thirds of patients with ADHD experiencing some level of impairment (98), long-term morbidity (93), as well as an associated risk of mortality which is significant (96).Common ADHD symptoms that persist into adulthood are often those affecting executive function as well as working memory (98).

Mannuzza (2000) looked at the long-term natural history of untreated ADHD and found several associations between childhood ADHD, and antisocial personalities, drug-taking behaviour, and educational and vocational disadvantage in adulthood (95). This study highlights the need for ongoing monitoring of children with ADHD as well as the proven benefit of ADHD medication (95).

2.10 Special interest groups – the pre-schooler and children born at the end of the academic year

Typically developing pre-schoolers may exhibit inattention, impulsivity and excessive active behaviour, thereby making it difficult to differentiate behaviour that is suggestive of ADHD in this age group (99). However, the number of pre-school children being diagnosed has doubled from 2007 until 2016 (100), and there has been a steady increase in the medication being prescribed for ADHD in this group which is often used off-label (101).

The revised ADHD guideline from the American Academy of Paediatrics in 2011 did include this group of children in its recommendations (71), however no modifications have been made in the DSM 5 to include the pre-schooler group (102). The 2008 NICE guideline recommended no medication in the under 5 age group. This has been updated to say that ADHD-focused group parent training, if unsuccessful in severe cases, warrants a specialist opinion suggesting medication may be an option (3).

Behavioural interventions constitute first-line therapy for ADHD management in the preschool years however psychostimulants have been shown to be highly effective (103). There is currently no evidence available in this age group that compares behavioural interventions with medication directly (2). Efficacy and safety profiles of medication are not comparable to those found in the school age years with future studies necessary (103).

However, reviews on both structural and functional MRI research investigating the effects of methylphenidate in children with ADHD provide evidence that long-term stimulant use normalizes structural brain changes in white matter, the thalamus, the cerebellum, and the anterior cingulate gyrus (104). The PATS study, the largest study of pre-schoolers with ADHD, documented improved behavioural outcomes for more than 300 pre-schoolers aged 3 to 5.5 years with severe ADHD following treatment with methylphenidate (99).

Younger children entering primary school have been found to more commonly diagnosed with ADHD as opposed to their peers. A very recent study published in the NEJM (105) examined the prevalence of ADHD diagnoses amongst younger children entering the first year of primary school. The findings showed these younger children received more ADHD diagnoses and treatment for the disorder than the older children in the group. Children born in August were compared to those born in September at schools that have an age cut-off of 1 September. No other consecutive months showed such startling differences in terms of ADHD diagnosis and treatment.

No other medical condition examined in the study showed a difference between those children born in August versus those in September. And lastly, ADHD rates were no different in August and September children where the cut-off was not 1 September (102). This study emphasises the importance of the context of other children in a child's grade when it comes to an ADHD diagnosis and the treatment that is prescribed (102).

2.11 Knowledge and Perceptions of Educators Regarding ADHD

The classroom is a difficult environment for the child with ADHD as the symptoms of the condition often hinder the behaviour that is required in a school setting (106). Teachers play a crucial role in this condition. Their perceptions – defined as 'the way something is regarded, understood and interpreted' – and their knowledge – 'facts, information, and skills acquired through experience or education' – impact on these children.

Teachers may be the first to notice the signs of ADHD, they may be a collateral in the diagnosis, they may be required to manage the child's behaviour in class and possibly administer medication (5). Teachers are more likely to suggest an ADHD diagnosis in a child than a parent, other school personnel, psychiatrists or paediatricians (107). As the diagnosis of ADHD can only be made if the features are evident across settings (13), a teacher's opinion is vital. Their input about a child's behaviour, such as filling in a Connors scale, contribute to the doctor making the diagnosis (107). As a child spends the main part of his day at school, teachers are responsible for managing these children and helping them to learn (108)(109).

Teachers too may be involved in the treatment of ADHD as they may be required to administer medication during the school day (110). These students' success at school is largely influenced by teachers who are willing and actively involved in working with them, in the framework of a system that supports identifying those with ADHD and providing necessary interventions (111).Teachers attitudes towards a

student with ADHD impacts on how other children in the classroom perceive that child. Children with ADHD may have emotional regulation difficulties and learning problems which require a lot of input and time from a teacher (110). Children with ADHD have been found to be more challenging for teachers than children who have sensory and motor disabilities (112).

Teachers commonly offer advice to parents regarding management of ADHD thus any perceptions that teachers may hold might have a marked impact on management at home. For example, the common misperception that sugar causes ADHD may result in dietary changes in the household (5), with little effect on the symptoms of the ADHD. Another common teachers' misperception is the association between prolonged stimulant use and the propensity towards drug addiction (113) which may result in unnecessary parental stress. Importantly, understanding and knowledge about ADHD has been shown to be related to teachers attitudes and behaviour towards these children, highlighting how crucial the school environment is to children with ADHD (113) (72). The results from an Australian study suggest that a greater knowledge of ADHD is likely to have an impact on teachers' behaviours and perceptions in both a positive and an essential way (108).

Interestingly, parental concern in relation to ADHD behaviour is generally lower than teachers, suggesting that teachers often play a bigger role in the diagnosis of ADHD than parents (54).

2.12 International Literature on Teachers' Knowledge and Perceptions about ADHD

Internationally, numerous research papers have examined teachers' knowledge around ADHD, and the majority of the findings suggest that ADHD knowledge is limited (11). The main reason for this seems to be inadequate ADHD training (12).

A study on Saudi Arabian teachers found them to have areas of little knowledge about ADHD as well as many misconceptions about the disorder, mainly about the causes and treatments (114). A Melbourne study using vignettes concluded that only 50% of the teachers identified the type of ADHD correctly (115). Limited knowledge and misperceptions surrounding ADHD was also seen in research from Taipei, Taiwan,(116) as well as from India (117) (118).

American and Canadian teachers' knowledge about ADHD was explored using a self-reported questionnaire (117). They generally had a good knowledge relating to causes and the educational implications of ADHD, however many perceived non-medical interventions such as diets as having a positive impact on ADHD symptoms. Many also believed that ADHD would be outgrown. In-service training was limited, however teachers expressed that they wanted more formal training (119). A Nigerian study focused on training programs, and showed that interventional ADHD training programs for teachers positively impacted on ADHD knowledge (120).

In Trinidad and Tobaga, teachers' knowledge about ADHD was assessed with a questionnaire. Results suggested that areas of weakness included the identification of children with ADHD, as well as their appropriate management (121).

2.13 South African Literature on Teachers' Knowledge and Perceptions about ADHD

Very few studies have been conducted in South Africa examining teachers' perceptions and understanding of ADHD. In 2010, the KADDS was used amongst teachers in Alexander township in Johannesburg (10). Results showed that teachers lacked knowledge about ADHD, and some main aspects of ADHD were misperceived (10). The reason for this lack of knowledge is most likely due to the resource-poor environment as well as limited training on ADHD.

Perold (2010) used the KADDS questionnaire amongst primary school teachers in the Cape Metropole and found that the majority were able to recognise ADHD behaviour, however their knowledge relating to ADHD causes was limited (11).

A South African study looked at 200 teachers in the public schooling system in Kimberley (122). The results show that the majority of teachers are knowledgeable about the symptoms and diagnosis of ADHD but less so about the general associated features and treatment (8).

A study in Johannesburg included 15 schools, 8 public and 7 private, and consisted of both open and closed questions regarding ADHD (8). Results of both sectors was similar in the areas of ADHD causes, incidence and treatment modalities (8).

Ntuli (2014) used a questionnaire on ADHD that was distributed to both mainstream and remedial schools in the Ekurheleni district in Johannesburg (123). She felt negative attitudes about ADHD impacted on these pupils' learning, and educators' ADHD knowledge was limited (123).

2.14 Conclusion

ADHD is a common neurodevelopmental disorder. Untreated, the long-term prognosis of this disorder is poor, with ADHD sufferers not succeeding at school, in the workforce and in relationships. There is associated co-morbidity with mental health issues such as depression, anxiety, a poor self-esteem, and drug-taking behaviour.

Teachers can play an ongoing and pivotal role in these children's lives in the areas of recognising features, communicating with specialists, and managing these children's behaviour in a class room environment. As such it is vital that teachers have a deep

understanding of ADHD. This should encompass knowledge about the causes of ADHD which are multifactorial, with genetics interacting with environmental factors to produce the ADHD phenotype.

Management of these children often involves medication, however in a classroom setting certain behavioural techniques are helpful to allow these children to reach a level where they are able to perform well both academically and socially.

Studies done internationally and nationally on teachers' perceptions and knowledge of ADHD all show that there are definite areas that are lacking on this topic, and further training is suggested amongst Foundation Phase teachers.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Research questions, aims and objectives

This chapter presents the methodology that was used in this study and includes the design of the study, population and sampling methods, and the procedure that was utilised. The measurement tools are also described and a detailed description of the methodology is given.

3.2 Study Design

The study design uses a dominant-less-dominant design as described by Mark and Shotland (2000) (124). The rationale for this study design is that the quantitative data will provide a general holistic understanding of the research problem, and the qualitative data component and analysis will refine and elucidate the quantitative outcomes by examining participants' views in greater depth.

3.3 Study population and sampling

This study took place at 9 Independent Primary Schools in Johannesburg from January 2019 until March 2019. The study population was teachers in the Foundation Phase. The sample size was 95 teachers who agreed to participate. These educators were believed to have certain characteristics that would enable them to provide the relevant information required for the aim of this study, therefore this sample was considered a purposive sample of convenience. Foundation phase educators were specifically selected for this study as this is often the schooling period when ADHD symptoms become evident (111). This was a convenience sample as the teachers were willing to participate in this study.

Twenty-six schools were invited to participate in the study. The invitation to participate was extended via email, and those who didn't respond were followed up

by a phone call. Three schools declined to participate, 11 schools never responded to either email or telephone communication, and 12 schools agreed to participate in the study, with 3 teachers being used in the pilot study. The final sample consisted of 95 Foundation Phase teachers.

3.3.1 Inclusion Criteria

Foundation Phase teachers in the Independent School setting, who had consented to participate in the study

3.3.2 Exclusion Criteria

Teachers in the Independent School setting who do not wish to participate as well as teachers in government school settings

3.3.3 Pilot Study

A pilot study was implemented using 3 Foundation Phase teachers. The purpose was to ensure that the questionnaire was clear and easy to understand, as well as to confirm that the allocated time to fill out the questionnaire was appropriate. The data was analysed and reported thereafter.

3.4 Instruments

The Knowledge of Attention Deficit Disorder Scale (KADDS) questionnaire was utilised for this study (See Appendix B). It was developed by Professor Mark Sciutto in 2000, and the questionnaire divided ADHD into 3 components: 1) associated features of ADHD, 2) symptoms and diagnosis of ADHD, and 3) the treatment of ADHD. The questionnaire consists of 39 statements, and the respondent is required to circle if each statement is true (T), false (F) or they don't know the answer (DK). The purpose of this format is that a distinction is made between what teachers do not know versus concepts they believe incorrectly i.e., misconceptions.

Items 1, 4, 6, 13, 17, 19, 22, 24, 27, 28, 29, 30, 31, 32, 33 & 39 address associated features of ADHD, questions 3, 5, 7, 9, 11, 14, 16, 21, 26 & 38 are about symptoms and ADHD diagnosis, and 2, 8, 10, 12, 15, 18, 20, 23, 25, 34, 35, 36 & 37 explore teachers' knowledge regarding treatment options for ADHD.

The KADDS is a standardised and reliable tool. The ease with which one can administer and utilise it has made it a popular tool for researchers.

The KADDS has been used internationally (11), such as certain European countries (125), in Vietnam (126), and in the Middle East (114). A cross-national study examined teachers' perceptions and knowledge about ADHD in 9 countries, which included South Africa. The other countries that participated in this study were the Czech Republic, Greece, Iraq, Korea, America, Saudi Arabia, Vietnam and Germany (11). In Taipei, Taiwan, the KADDS was given to EFL (English as a Foreign Language) teachers to fill out to assess their knowledge on ADHD (116). In India, the KADDS was used both in Mohali and Uttar Pradesh (2018) in separate studies (117).

The study uses a prospective descriptive analytical design in the first two sections, 1) the demographics and 2) the questionnaire. Section A of the questionnaire (Appendix A) considered the teachers personal details such as gender, age, level of education and teaching experience. Teachers also needed to circle how many ADHD articles they had read as well as how many workshops on ADHD they had attended. They were required to quantify the number of children with ADHD they had taught during their career, if they knew anyone with ADHD outside school, and if they felt confident to teach a child who had a diagnosis of ADHD. The second part was Section B which was the KADDS questionnaire.

3.5 Procedure

The KADDS questionnaires were brought to the schools whose principals had agreed to participate in the research. The purpose of the study was explained to the

participating teachers. They signed the consent forms agreeing to take part in the study, and they were then given 15 minutes to complete the demographic section as well as the questionnaire. Upon completion, the questionnaires were handed back to the researcher, and no names were written on the questionnaires.

An informal directed discussion group (Appendix I), similar to a focus group, was conducted with 32 candidates. These teachers had all completed the KADDS Questionnaire and consented to participate in the discussion group. The venue was the staff room at one of the participating schools. The duration of the group was approximately 1 hour. The chief investigator and one of the supervisors interviewed the candidates, and the interview was audio-recorded and notes were taken. Open-ended questions relating to the pertinent themes of the questionnaire were explored.

A focus group is defined by Leder (1995) as ‘a technique involving the use of in-depth group interviews in which participants are selected because they are a purposive, although not necessarily representative, sampling of a specific population, this group being ‘focused’ on a given topic’ (127). Similarly, this was the rationale behind using this discussion group.

Focus-group interviews and discussion groups as a source of qualitative data collection have become exceedingly popular amongst health professionals (128). A focus group provides researchers with access to the language respondents use, as well as core concepts utilized by the respondents to explain their own personal experiences on a specific topic (129). It provides the respondent with an opportunity to give thought to the topic and speak it through (129). Focus groups also function to shift beyond the level of the individual as they examine shared cultural knowledge of the group members (130). A focus group essentially provides a collective sense of community that is shared by the group (130).

By using this discussion group in addition to the KADDS questionnaire, the quantitative arm of the study, the hope was that the group would also serve to enrich the information ascertained from the survey.

3.6 Ethical Considerations

Ethics approval was granted from the Human Research Ethics Committee (Medical) of the University of Witwatersrand (M180967) to proceed with the study.

Consent forms were provided to the school principals as well as to the participants who completed the questionnaires. The aim of the study was clearly outlined, and anonymity was ensured. The participants understood that their names, their schools and their pupils would not appear in the research or subsequent publications. The consent form also clearly explained that it was their right not to participate if they so wished.

The researcher was present when the forms were completed thus teachers had the opportunity to ask any further questions or clarify certain aspects of the study.

Regarding the discussion group, teachers who chose to participate were given a consent form to sign agreeing to be part of the group, as well as a consent form that they agreed to be audio-recorded. As confidentiality is difficult to ensure in this scenario, the consent form had guidelines that asked participants to respect one another's privacy, not share what was said during the group, and allow a safe space for participants to express their views. Participants were asked not to use names in the discourse. These group rules were reiterated at the beginning of the group discussion.

3.7 Statistical Analysis

Descriptive and inferential statistics and graphs were used to describe both the sample respondents and the measurement scales, as well as to answer the research questions of the study. The demographic characteristics of the respondents were illustrated using pie charts graphs. Thereafter, the distributions of scores on the three content areas of the KADDS were plotted, and the Shapiro test was used to examine

for normality. Where there was non-normality of the score distributions, the parametric ANOVA tests were validated using the non-parametric equivalent Kruskal-Wallis test.

The Bartlett test for variance was used for each of the categorical demographic variables. One-way Analysis of Variance (ANOVA) was used to compare the mean responses of the respondents across the levels within each demographic variable on all three KADDS subscales. For all the variables for which the one-way ANOVA was significant, the ad hoc tests of Tukey were used to determine which groups were significantly different. For those variables whose variances were not equal, the Kruskal-Wallis test was implemented.

Measures of Association were measured using the Chi-Square and Pearson Correlation Coefficient to see if certain variables had an association. A p-value of 0.05 or less was taken to be significant.

CHAPTER 4

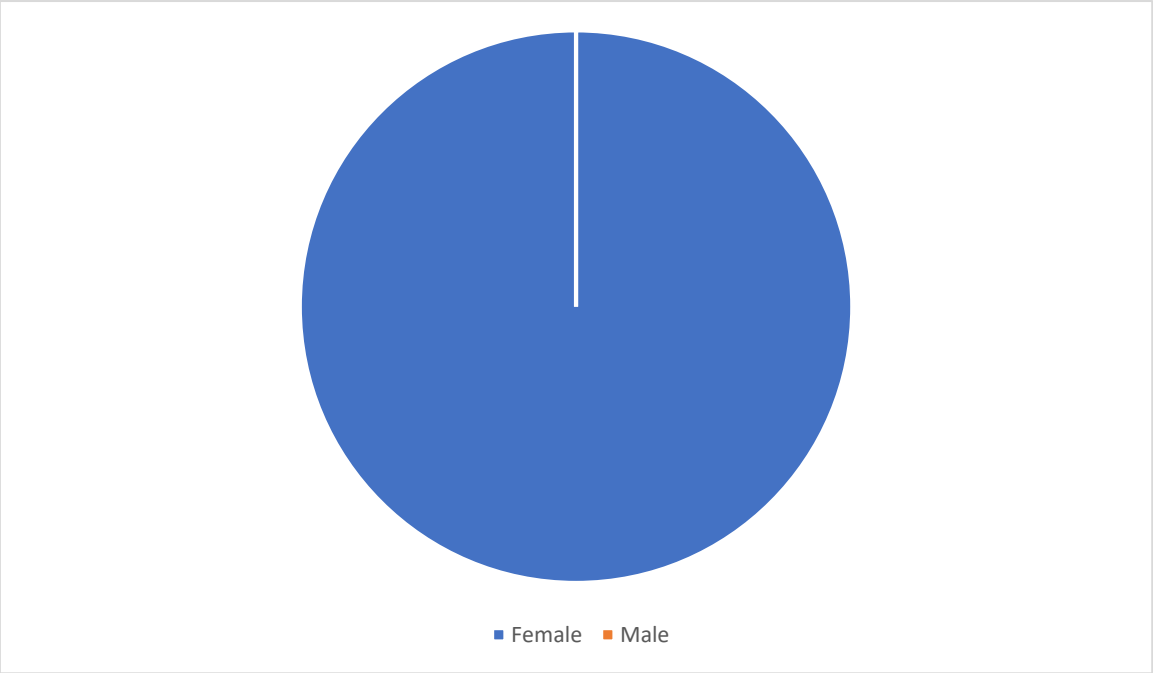
RESULTS

4.1 Introduction

This chapter will present the findings of this research. A detailed description of the different variables being tested and their association with knowledge in the 3 categories of ADHD will be explored and tabulated. The KADDS findings will be presented and interpreted in conjunction with some of the relevant information from the focus group.

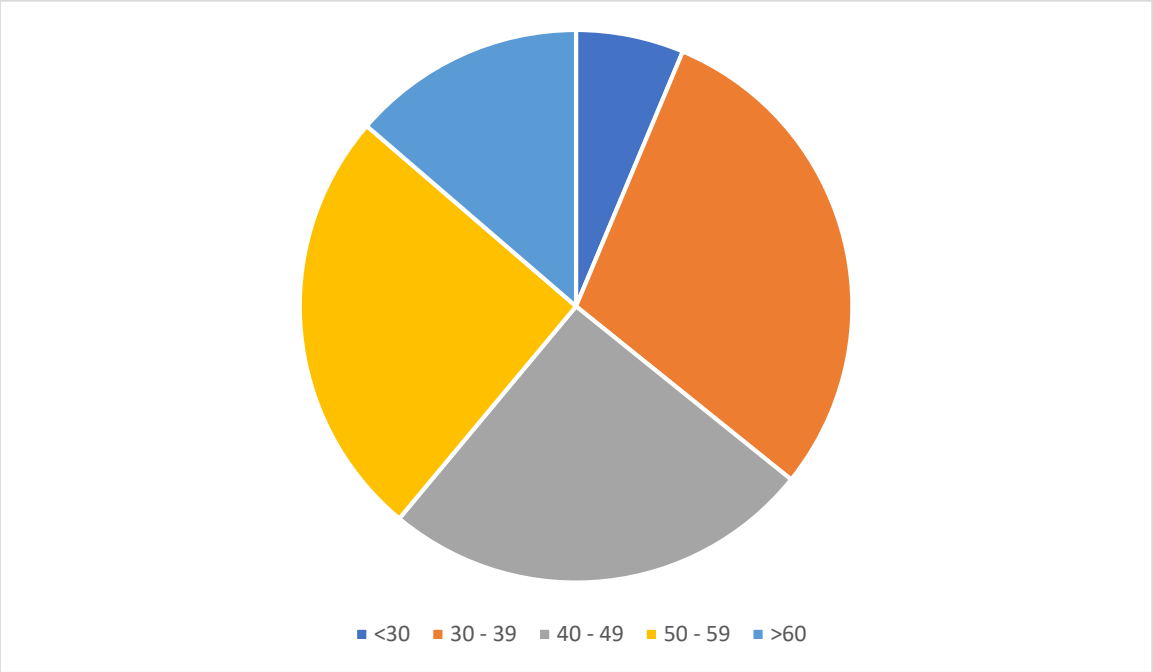
4.2 Sociodemographic variables

4.2. Gender of teacher



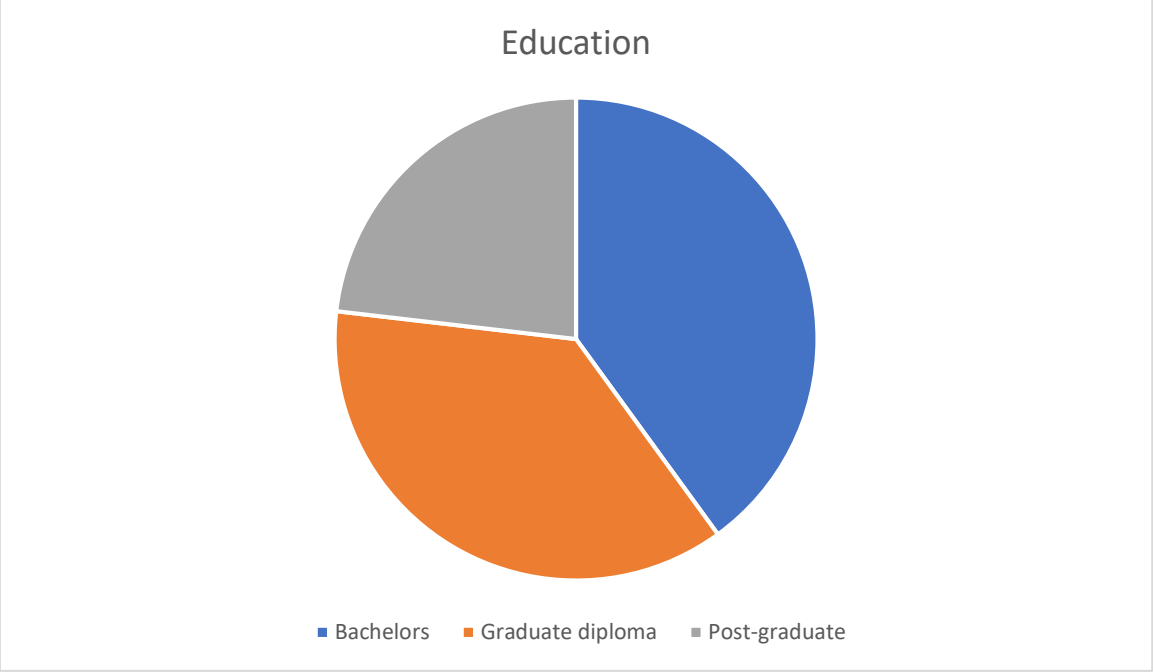
All 95 teachers who participated in this study were female.

4.2.2 Age of teachers



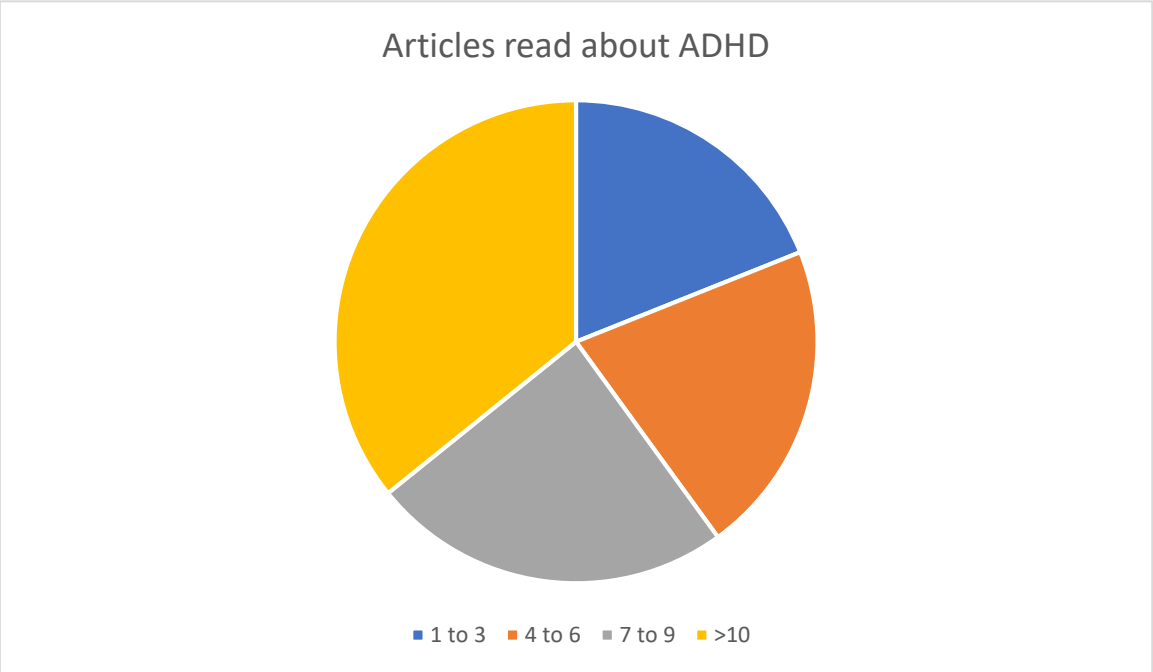
6 teachers were under the age of 30, 28 teachers were between 30 and 39 years old, 24 teachers were 40 to 49 years old, 24 teachers were between 50 and 59 years old, and the remaining teachers (13) were over 60 years old.

4.2.3 Level of education



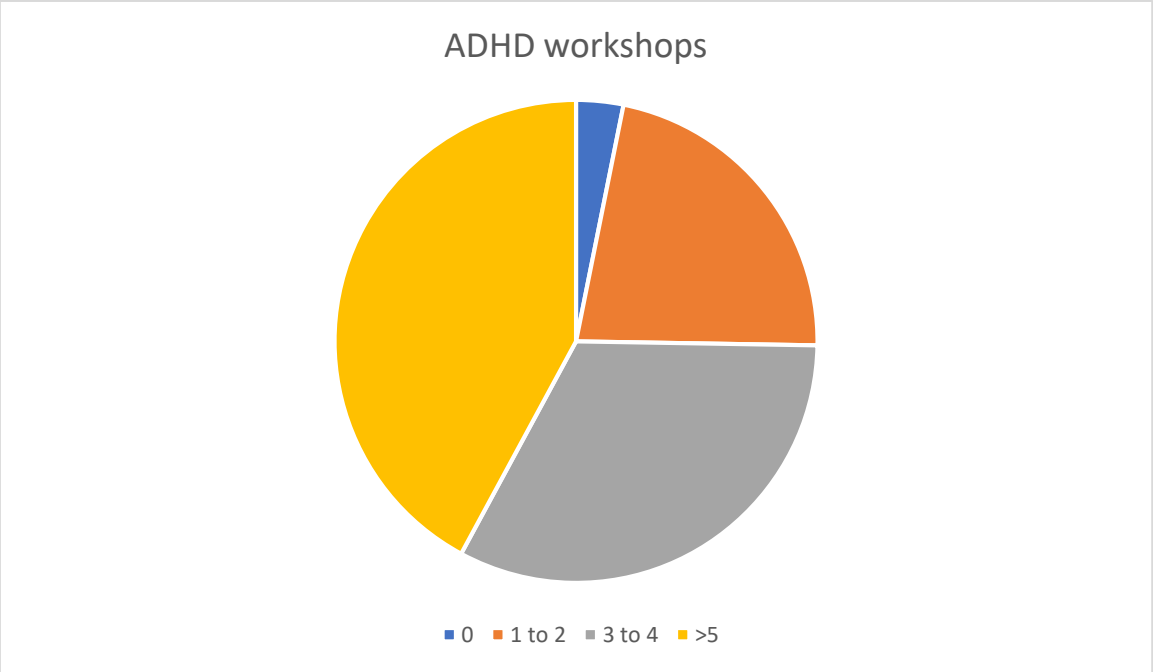
Most of these teachers had a bachelor's degree (38), 35 had a graduate diploma, and the rest of the teachers had a post-graduate degree (22).

4.2.4 Articles read



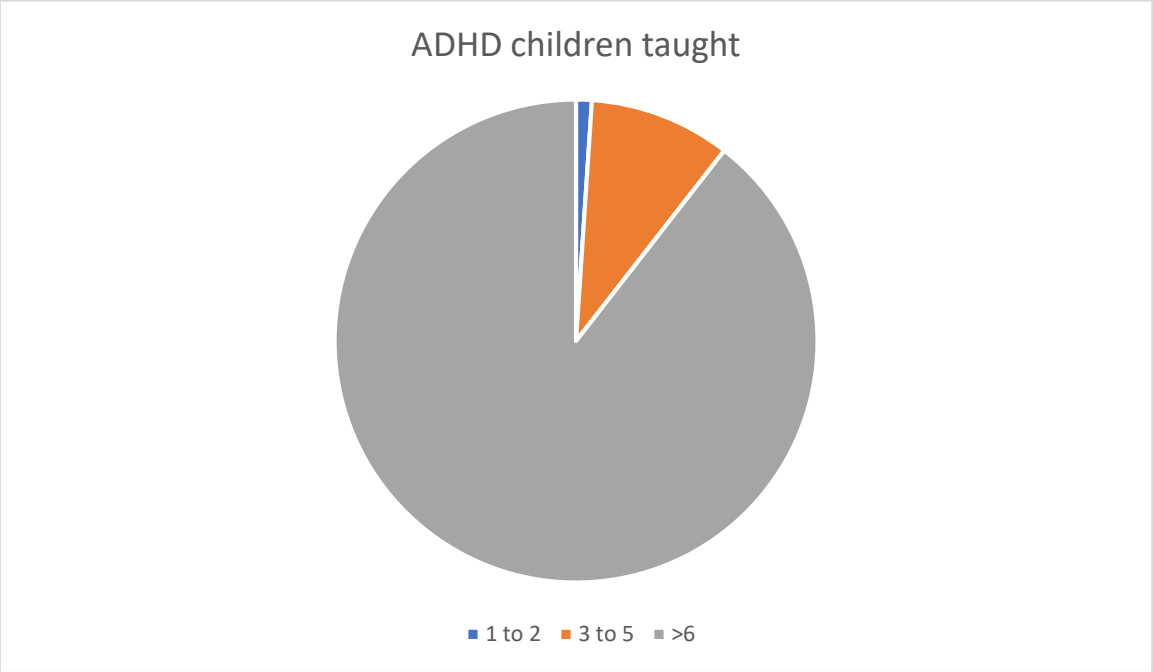
18 teachers had read between 1 and 3 articles on ADHD, 20 teachers had read between 4 and 6 articles, 23 teachers had read 7 to 9 articles, and the remaining teachers (34) read more than 10 articles

.4.2.5 ADHD workshops



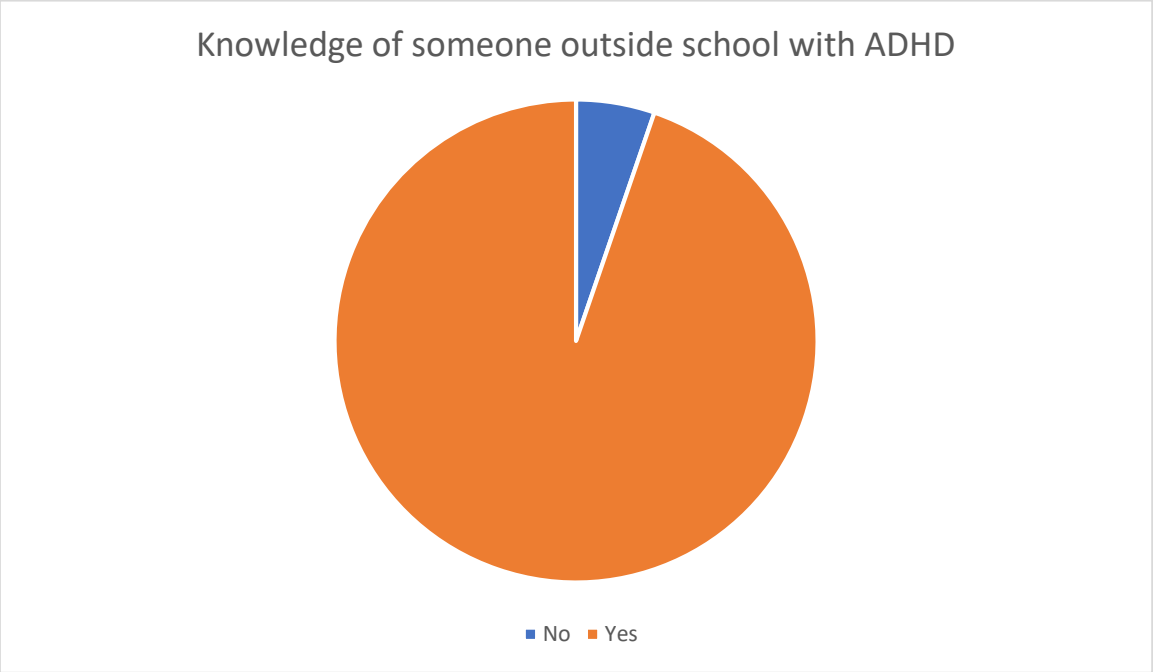
Very few teachers (3) had attended no workshops, 21 had attended 1 - 2 workshops, 31 had attended 3 to 4 workshops, and majority of the teachers (40) had attended more than 5 workshops.

4.2.6 ADHD students taught



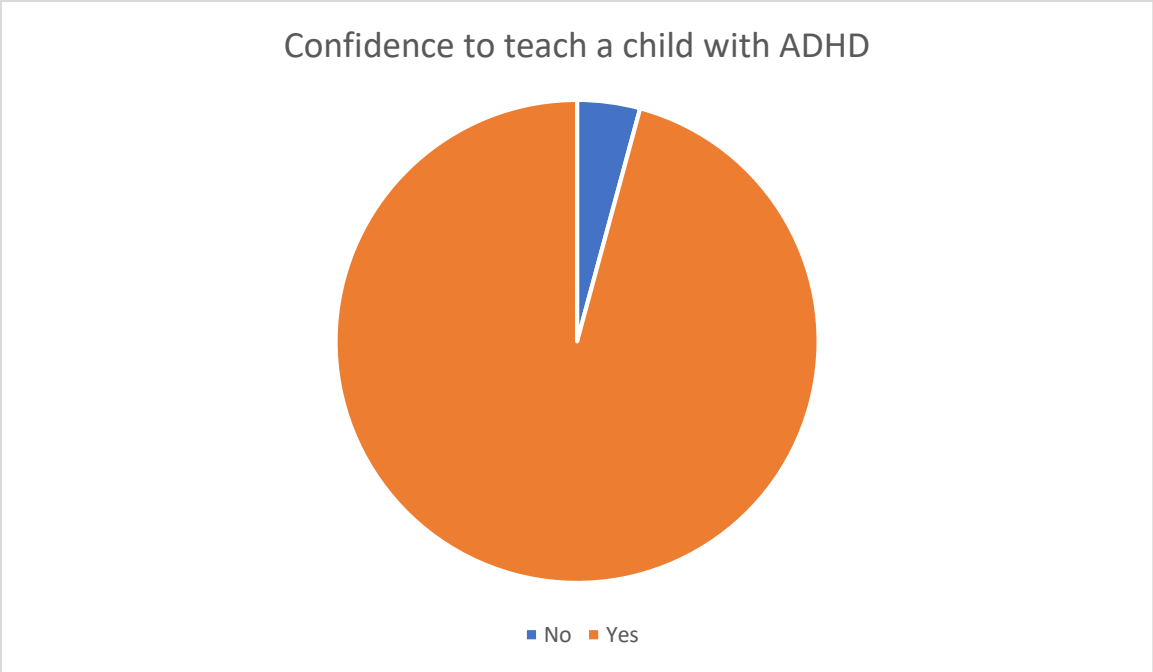
Only 1 teacher had taught less than 2 children with ADHD, 9 teachers had taught 3 to 5 children with ADHD, and the vast majority of these teachers (85) had taught more than 6 children with ADHD.

4.2.7 Knowledge outside of person with ADHD



Only 5 teachers did not know someone outside the school environment did not ADHD, while the other 90 teachers did.

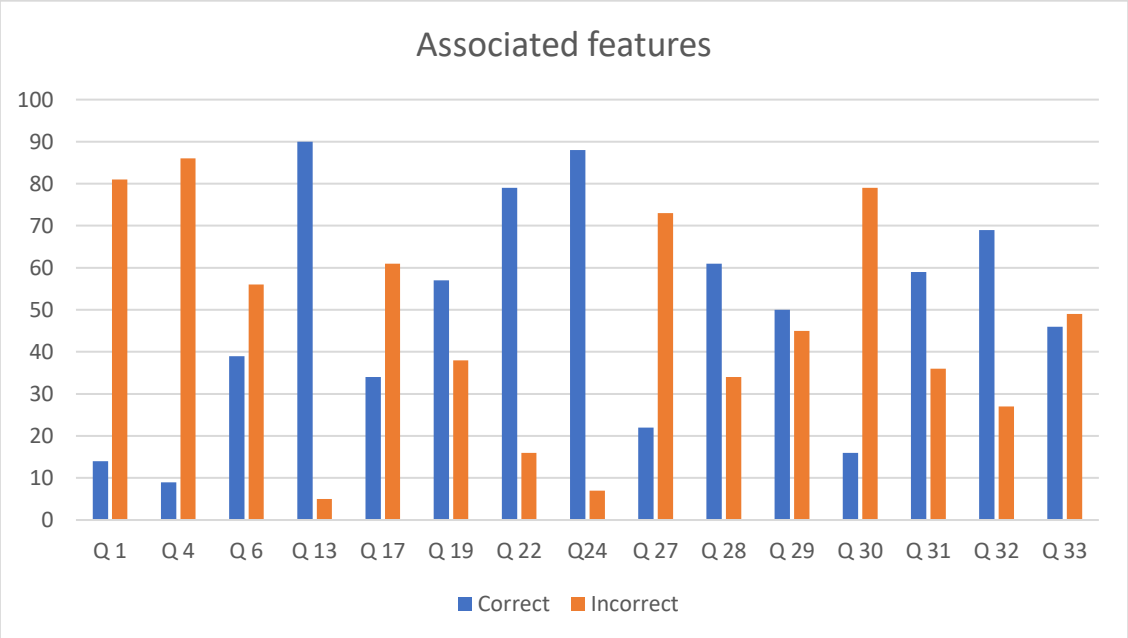
4.2.8 Confidence to teach a child with ADHD



Only 4 teachers felt that they were not confident to teach an ADHD child, while the remaining 91 teachers felt they were.

4.3 KADDS Questionnaire

Bar graph 4.3.1



In this section, 6 of these questions were answered incorrectly by the group. The overall score was 57%. Teachers were unsure about the prevalence of ADHD (Statement 1), behaviour compliance with parents (Statement 4), the impact of genetics in ADHD (Statement 6), and the association with depression (Statement 17). Overall, they never knew that ADHD behaviour may appear similar to normal behaviour in a 4-year old (Statement 30), and that in novel situations ADHD behaviour may in fact appear better (Statement 27).

4.3.1 Causes and prevalence of ADHD

The genetic effect of ADHD (Statement 6) was largely unknown in the group of participants with only 41% (39 teachers) answering correctly. A teacher in the focus group who answered this correctly said *"There's a large genetic component. We teach an ADHD child, and when we meet the parents it's obvious that one of them has ADHD too."* ADHD is a diagnosis based on behaviour, and 61 teachers (64.2%) were aware that a person who has ADHD displays no specific physical features that would suggest a diagnosis of ADHD (Statement 28).

The vast majority of teachers were unaware of the latest statistics on ADHD in school age children (Statement 1), with only 14 teachers (14.7%) having the correct answer. The prevalence of ADHD differs between males and females (Statement 29), and 50 teachers were aware of this (52.6%).

4.3.2 Disease progression and associated co-morbidities

In this category 90 (94.7%) teachers knew that it was possible for an adult to be diagnosed with ADHD (Statement 13). Fifty seven of the 95 teachers (60%) knew that ADHD symptoms are generally not outgrown (Statement 19). "*By high school many have stopped their medication and are doing nicely, however many do need it long term from Grade 1 until matric"*. Only 35.8% of participants (34 teachers) were aware that children with ADHD have higher rates of depression than those without ADHD (Statement 17).

4.3.3 Behaviour in the classroom

Eighty eight out of the 95 teachers (92.6%) knew that an ADHD diagnosis does not always make a child eligible for placement at a special school (Statement 24). Other factors such as severity and co-morbidities would need to be considered.

ADHD behaviour and normal 4-year old behaviour (Statement 30) may appear to be the same, and only16 teachers (16.8%) in this group were aware of that.

Fifty-nine teachers (62.1%) were correct in saying that children with ADHD are more obvious in a classroom setting than in a free play environment (Statement 31). "*We have a basis of comparison with the other children in the class so we're able to see which children may benefit from medication. If the whole class is unable to sit still then we realise that our program may be pitched at the wrong level and needs to be adjusted."*

Sixty-nine teachers (72.6%) knew that the majority of school aged children with ADHD have some degree of poor school performance (Statement 32). "*Test situations are often difficult as they don't always perform as well as they should. We've had children who we feel need medication but their parents don't want it and in tests they'll leave out part of the paper. This has implications when they're doing assessments and benchmark tests where they do far worse than what they're capable of doing"*

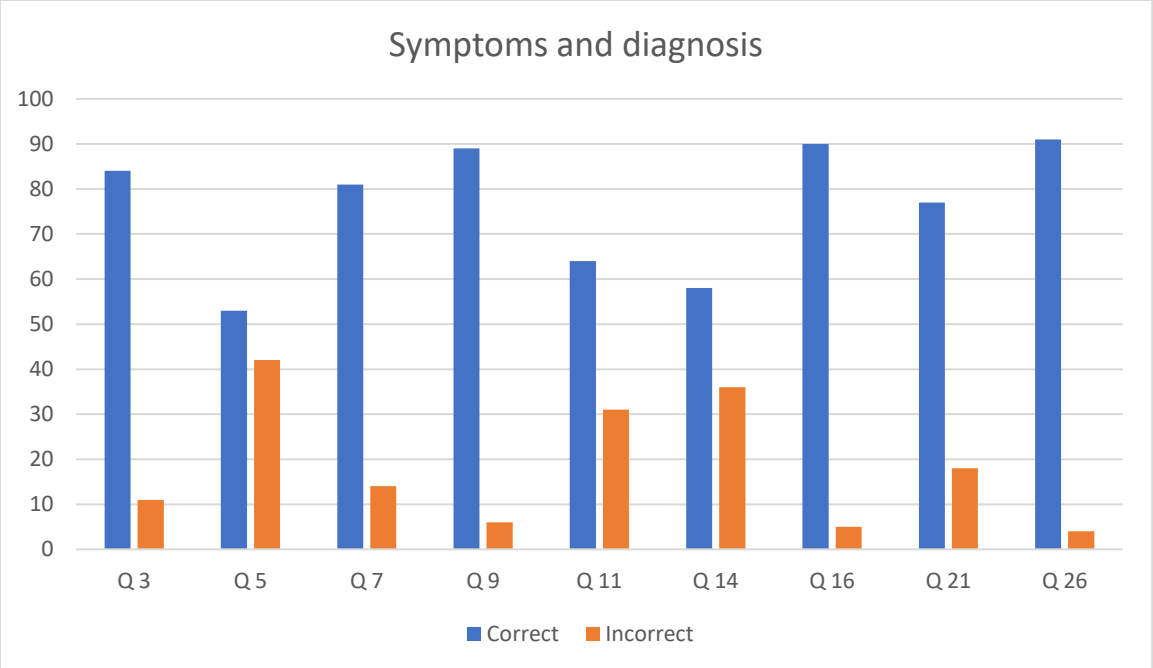
4.3.4 ADHD behaviour at home

Children without ADHD may exhibit ADHD symptoms if they come from home environments that are either chaotic or inadequate (Statement 33) and 46 teachers (48.4%) in this group answered this correctly. Only 9 (9.5%) teachers knew that these children were more compliant with their fathers than their mothers (Statement 4). Thirty-one teachers marked this answer as 'I don't know'.

Seventy-nine teachers (83.2%) were aware that demonstrating sustained attention to a video game for an hour does not mean a child with ADHD will be able to concentrate on homework for an hour (Statement 22). "*Parents will often say their child can play Lego for hours or sit still in front of the TV, or they can do a difficult puzzle on their own. They don't see that with a time limit the child will probably battle and it's different to applying knowledge during a class activity. Also, it's an area of interest so they're able to concentrate better, and there are limited distractions compared to a busy classroom.*"

Only 22 of these teachers (23.2%) were aware that children with ADHD experience less problems in a novel situation (Statement 27).

Bar graph 4.3.2



The results of this section showed that most of teachers in this group had a good understanding of the diagnosis and symptoms of ADHD, and there was an overall correct score of 80.5%. Every question in this section was answered correctly by the majority of the teachers.

4.3.5 Diagnosis of ADHD

Ninety teachers (94.7%) were aware about the classification of ADHD into 2 clusters (Statement 16). For an ADHD diagnosis to be made, symptoms need to be present in 2 or more settings (Statement 21) and 77 teachers (81%) knew this. 53 teachers (56%) knew that ADHD symptoms do not need to be present before the age of 7 years (Statement 5).

4.3.6 Inattentive and hyperactive symptoms of ADHD

Eighty-four teachers (88%) here knew that children who have ADHD are distracted by extraneous stimuli (Statement 3). "*When they're on their own with no distractions, they can sit for hours and do puzzles or Lego. In a busy classroom they're often unable to do the work. They'll hear a sparrow outside the class and think "What's that?" and forget about their class work."*

The majority of teachers (93.7%) were aware that children squirming in their seats is a feature of ADHD (Statement 9). An ADHD diagnosis means that children are often disorganised when it comes to tasks and activities (Statement 26), and 91 teachers (95.8%) knew this.

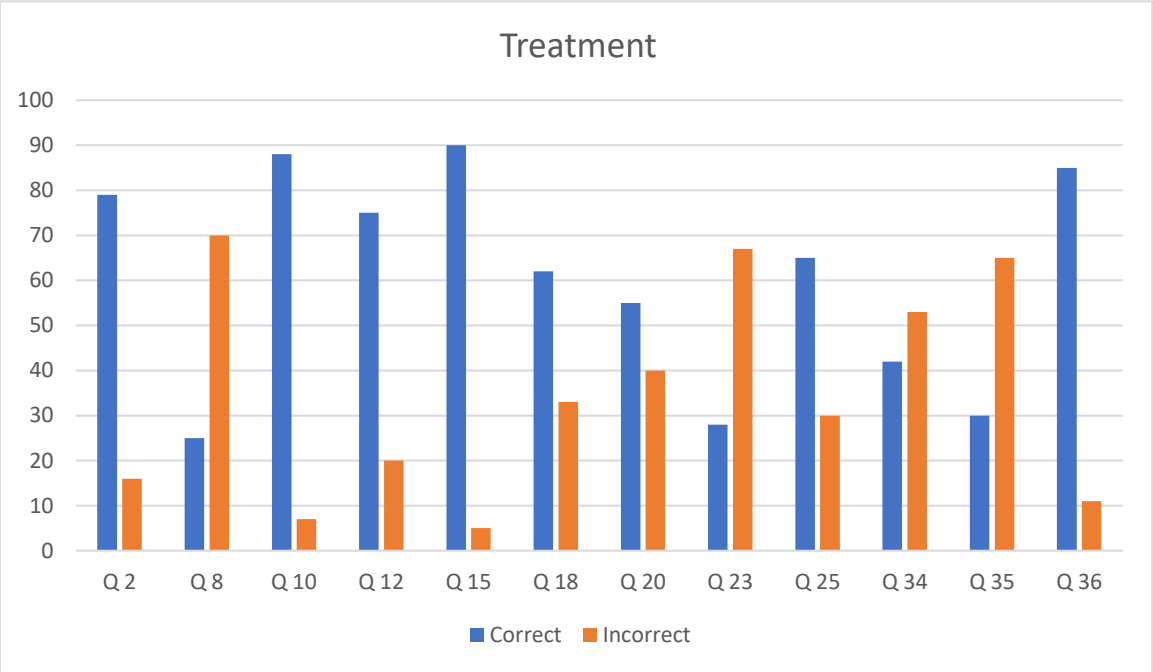
4.3.7 Symptoms that are not associated with an ADHD diagnosis

Eighty-one teachers (85%) were aware that being cruel to others is not a feature of ADHD (Statement 7). Children with a diagnosis of ADHD do not steal or destroy other people's things (Statement 14), and 58 teachers (61%) knew this.

Sixty-four teachers (67.4%) knew that a good self-esteem is not common with children with ADHD (Statement 11). *"Their self-esteem often improves with the*

medication. It is very undermining for the child when they can't perform on a par with their colleagues".

Bar graph 4.3.3



In this section on treatment, the overall score was 63%. Four questions were failed overall by the participating teachers. The majority of this group of teachers were unaware that anti-depressant medication may play a role in ADHD treatment (Statement 8). Almost all of these teachers felt that sugar and colourants influence ADHD behaviour negatively (Statement 23). These teachers felt that inattention is the key aspect addressed in behavioural therapy (Statement 34) which is incorrect, and only a few teachers knew that ECT (Statement 35) plays no role in treatment.

4.3.8 Behavioural and non-medical management of ADHD

Current research does not show that ADHD is the result of poor parenting (Statement 2). Most of the respondents (83%) knew this. Sixty-two teachers (65%) correctly answered that individual psychotherapy is not sufficient treatment for most of these children with ADHD (Statement 18). Eighty-five teachers (89.5%) correctly answered

that focusing primarily on punishment as a form of treatment is not effective in reducing symptoms (Statement 36).

Medication combined with parent and teaching training is generally effective (Statement 10) and 88 teachers (92.6%) knew this. Behavioural interventions for ADHD do not primarily focus on inattention (Statement 34) and 42 teachers (44.2%) in this group were aware of that.

Only 28 teachers (28.5%) knew that reducing sugar or food additives did not reduce ADHD symptoms (Statement 23). One teacher in the focus group when asked if sugar affects behaviour answered, *"Yes definitely! Our school tuckshop has limited sweets. With the younger kids we try implement that sweets are rather eaten at second break".*

4.3.9 Pharmacotherapy for ADHD

In severe cases medicine may be instituted as first line therapy (Statement 20) and 55 teachers (57.9%) knew this. Sixty-five teachers (68.4%) knew that stimulant drugs are the most common form of treatment (Statement 25). Seventy-five teachers (76.8%) knew that termination of ADHD treatment is often associated with symptoms returning (Statement 12).

Ninety teachers (94.7%) were aware of the side effects of the stimulant medication (Statement 15). "*We often see a reduction in appetite. Children develop facial tics – they lick their lips, make funny faces, they rub their eyes. It makes them less outgoing. Weight gain is often a side effect of the anxiety medication. Some children pull out their hair."*

Only 25 teachers (26%) knew that anti-depressant medication may help in reducing ADHD symptoms (Statement 8). Thirty teachers (31.6%) were correct in answering

that ECT is not effective for severe cases of ADHD (Statement 35). Sixty-three teachers in this group were not sure of the answer and answered ‘I don’t know’.

4.3.10 Training

Questions 37, 38 and 39 were included for training purposes, they were added later to the KADDS and they were not categorised.

Fifty-one teachers (53.7%) knew that prolonged stimulant use does not lead to an increased addiction in adulthood (Statement 37). Thirty-seven teachers said they didn’t know the answer. “*Parents often mention they’re concerned that the medication may make their child turn into a drug addict. However, the opposite is true.”*

Less than half (44.2%) of the teachers knew that if a child responds to stimulant medication he does not necessarily have ADHD (Statement 38).

A small percentage (33.7%) knew that an inflexibility to certain routines and rituals is not a feature generally displayed by those with ADHD (Statement 39).

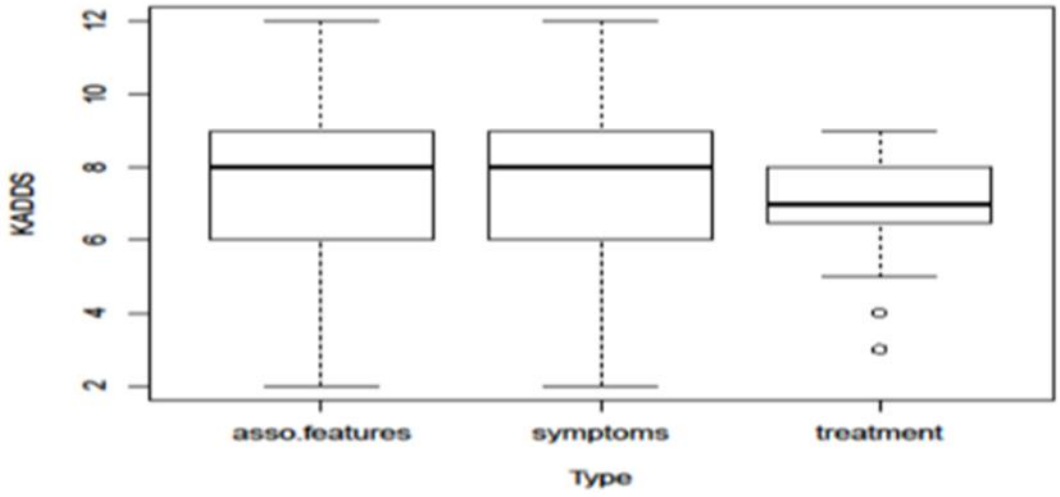
4.4 Statistics

The distributions of the total scores of the KADDS scale and its subscale scores were examined for normality using the Shapiro test, and comparisons between groups were performed with either one-way analysis of variance (ANOVA) for normally distributed data, or the Kruskal-Wallis test for non-normally distributed data.

Although the p-values for the teacher’s knowledge of “Associated Features” and “Symptoms” of ADHD were close enough to be considered normally distributed, the

“Treatment” score distributions indicated non-normality and so the Kruskal-Wallis test was used to test the median scores for all 3 categories. As demonstrated in Figure 1, the medians of all three categories were the same (p-value 0.19) implying that there was no significant difference in the teacher’s knowledge of the three sections.

Figure 1: Boxplot



The Bartlett test (Table 1) for variance was used for each of the categorical demographic variables and this showed that all the variables had equal variance except for “number of workshops attended” in the “Associated Features” group, “number of articles read” in the “Symptoms” group, and “number of articles read” and “knowledge of a child outside the school with ADHD” in the “Treatment” group.

Table 1: Variance test for each group using each of the variable

Variable	**Bartlett test statistics (p-values)**		
	Associated features	**Symptoms**	**Treatment**
Degree	4.008 (0.135)	0.215 (0.898)	0.409 (0.815)
Articles read	1.488 (0.829)	Infinity (0)	Infinity (0)
Workshops	Infinity (0)	2.357 (0.502)	1.829 (0.609)
Children with ADHD taught	3.98 (0.256)	0.752 (0.495)	2.251 (0.316
Children outside with ADHD	1.449 (0.229)	0.523 (0.470)	4.452 (0.035)

The ANOVA test was used to test whether the means for the variables with normal variance were significantly different in their respective categories (Table 2). As can be seen from Table 2, there were significant differences in the number of children with ADHD taught and teacher's knowledge of the "Associated Features" of ADHD ($p < 0.05$), the number of articles read, and the number of workshops attended ($p<0.05$), and teachers knowledge of the "Symptoms" of ADHD ($p<0.05$), and the number of children taught and teachers knowledge of the "Treatment" of ADHD ($p<0.037$). (Table 3) There were no differences in "teachers age" or "level of post graduate education" in any of the three categories. The results for the variables whose variances were not equal were confirmed using the Kruskal-Wallis test.

For all the variables for which the ANOVA was significant, the ad hoc test of Tukey was performed to determine which groups were significantly different. This test demonstrated that teachers who had taught three or more children had better knowledge of "Associated Features", "Symptoms", and "Treatment", of ADHD than those who had taught two children or less, and that teachers who had attended three or more workshops, or read four or more papers, knew more about the "symptoms" of ADHD than that those who had attended only one workshop or read only one paper on ADHD respectively.

Testing for measures of association between the variables showed a moderate positive linear relationship for the “number of workshops attended” and the “number of papers read on ADHD (Pearson correlation coefficient, 69%), while the “number of workshops attended” and the “number of children taught” with ADHD demonstrated a very poor correlation (Pearson correlation coefficient, 42%). There were no other significant associations for any of the other variable combinations.

Table 2: Testing Equality of Means using ANOVA

Demographic variable	**F test statistics (p-values)**		
	Associated Features	**Symptoms**	**Treatment**
Degree	2.063 (0.133)	0.261 (0.771)	0.674 (0.512)
Articles read	1.566 (0.190)	2.891 (0.027)	0.937 (0.446)
Workshops attended	0.921 (0.434)	5.950 (0.001)	1.480 (0.225)
Children with ADHD taught	4.953 (0.009)	2.665 (0.075)	3.425 (0.037)
Children outside with ADHD	0.024 (0.879)	1.798 (0.183)	0.155 (0.694)
Teaching experience	0.025 (0.875)	0.017 (0.898)	0.508 (0.478)
Age	0.032 (0.858)	1.352 (0.248)	0.533 (0.467)

CHAPTER 5

DISCUSSION

This research sought to investigate the knowledge and perceptions of Attention Deficit Hyperactivity Disorder of Independent Schools Foundation Phase teachers in Gauteng. The results of the administered KADDS questionnaire revealed that this group did particularly well compared to other groups that have participated in previous studies using the KADDS. Results of the study showed that the educators' overall percentage score of correct responses was 65%, which means that the respondents answered 65% of all of the 39 KADDS items correctly. This is one of the highest scores reported internationally where the KADDS tool was utilised. These results are very similar to those obtained by Kos (2008) (115) who reported that 61% of the items on the KADDS scale were answered correctly by the Melbourne educators. The high marks obtained in these two studies are most likely the result of the ongoing training and workshops that are being offered to these educators. In contrast, Lazarus (2013), in her work on Alexandra teachers, (10) had an overall mark of 35%, the study in the Cape Town Metropole had a final mark of 42.6% (5), and the cross-national study by Sciutto (2016) that looked at the overall results of 9 different countries had a total score of 47.8% (11).

In the current study 95 Independent Foundation Phase teachers filled out the KADDS questionnaire. They will from now on be referred to as 'the Independent School Teachers'. It is interesting to contrast these results with the Alexandra study by Lazarus (2013) where she had a very similar number of teachers, 100 teachers, who participated in her research (95). The results show the major disparity between the two groups. Lazarus (2013) found that only 35% percent of the KADDS was answered correctly, as opposed to the current study's overall mark of 65%. Moreover, of the 100 Alexandra teachers who filled out the questionnaire, 9 educators got a mark of 0 out of 39, that is not one single entry was answered correctly (10). No Independent School Teacher scored 0 overall. The group of Independent School Teachers had all attended ADHD workshops, with the vast majority falling into the 7- 9 workshop category. In the Alexandra study 75% of the sample had received no ADHD training at all, and two thirds had read no articles

about ADHD. More than half of the Alexandra group reported feeling unconfident to teach children with ADHD. This is in stark contrast to the Independent School Teacher sample of which only 4 of the teachers said they weren't confident to teach these children. The Alexandra study concluded that these teachers lacked knowledge about ADHD and misperceived certain key aspects of the condition (10). This seems to be related to both the lack of resources that are needed to recognise and manage ADHD, as well as having no training on the topic (10).

The schooling environment impacts on various aspects of ADHD and the teachers' role – from recognition of the symptoms, to discussing concerns with parents, to behavioural modifications that may be required in class. The perception of independent schooling, as examined in this study, would be completely different to that of the township schooling system described in the research by Lazarus (2013) for example (131)(132). Having small numbers of learners per class in independent schools with a low learner to teacher ratio should provide the teacher in the independent school with the opportunity to notice a child with ADHD behaviour. There may be adequate ADHD training for teachers organised through these independent schools (132), and as a result these teachers may be more aware of the features to look out for. The regular and ongoing relationship too between parents and teachers in private schools may give the teachers several opportunities to raise their concerns (133).

The possible reasons for the poor results on the KADDS among the Alexandra teachers are most likely due to the fact that ADHD is low on these teachers list of priorities. They are dealing with many issues that relate to the poor socio-economic environment in which their students live (128). In a study on inclusive education in South Africa, a focus group with public school teachers highlighted various issues these government school teachers need to deal with on a daily basis (134). These included very large classes of pupils (over 40 in this particular study), teachers and pupils lack of teaching materials, and children coming to school hungry as they have no food at home (131). There are often foreign pupils from surrounding African countries who are unable to follow what is being taught to them, and the teachers in

this study commented on the high levels of domestic abuse in these learners' homes (134). Educators in township schools are teaching pupils who contend with a great deal of stressors which include parental unemployment and informal housing (135). Thus, possible ADHD diagnoses amongst their students may not be their primary concern as they are dealing these children who often lack basic necessities.

However, another South African study which looked at both public and private school teachers' knowledge on ADHD, did not find a big difference between the two groups of educators (8). This study concluded that both sets of teachers had a poor understanding of ADHD, and their knowledge was limited to the behaviour they observed (8).

When making comparisons between the different subsets used in studies that utilised the KADDS, the current study found the section on *symptoms* was the section that was answered the best with a score of 80%, however the *treatment* section overall score was only 63%, and the *associated features* was the most poorly answered section with a score of 57%. Perold (2010) too, found that the teachers in the Cape Town Metropole were more aware about *symptoms* and had an understanding of the behaviour of ADHD, however when it came to ADHD causes which were asked in the *associated features* section, this was not well understood (5). The *symptoms* section was passed, whereas the other two subsets were both failed overall (5). Similarly, the Kimberley study found disparity between the *symptoms* of ADHD, and ADHD *treatment* and *associated features,* where the *symptoms* section was answered far better than the other two sections (122).

In '*the associated features'* subset, several questions were answered poorly by the Independent School Teachers. Similar results were found in previous South African studies. The teachers studied by Perold (2010) had a score of 42.6% (5) and the Kimberley group scored 41% for this section (136). This was in stark contrast to some international studies such as one on Canadian teachers by Jerome (1994), and educational interventional research by Barbaresi and Olsen (1998), where teachers

had good scores on ADHD *associated features* items, attaining 77.5% and 77% in this section respectively (119)(137). Kos et al (2006) reported that Melbourne teachers' knowledge about *associated features* was 61% (106). Sciutto (2016), in his cross-sectional study using various countries, had a far lower score of 47.8% in this section in his study. As his study encompassed many countries of varying socio-economic levels, this may indicate that overall the majority of these teachers had a lower number of workshops and training about ADHD (11).

Certain questions in this section were answered well, with most Independent School Teachers (two thirds) knowing that children with ADHD have a low self-esteem, as Mazzone (2000) commented that "A lower self-esteem profile is more common in subjects suffering from ADHD than in healthy control" (95), whereas most Kimberley teachers were unaware of this (118). This may reflect the Independent School Teachers experience with ADHD pupils and seeing the impact that ADHD has on these students perceptions of themselves and their self-worth.

The prevalence of ADHD was answered very poorly amongst the Independent School Teachers. This was echoed by low results found by the Alexandra teachers where only 4% had the correct answer (10) and the group of teachers studied by Perold (2010) (5). Reasons for this incorrect answer may be due to teachers feeling that the prevalence of ADHD is in fact higher. ADHD-like features such as inactivity or hyperactive symptoms may be present in certain children, however for a diagnosis to be made one needs to have 6 features in either the impulsive category or 6 features in the inattentive category. If fewer criteria are met, the diagnosis of ADHD cannot be made. Very few of the Independent School Teachers answered correctly that ADHD children display better compliance with their fathers than their mothers. This was answered better by the Alexandra teachers, however only 22% got the correct answer (10), and it was one of the main misperceptions found with the research by Sciutto (2016) (11).

Forty one percent of the Independent School Teachers were unaware that that ADHD has a genetic link. Interestingly, in a sample of teachers studied by Glass and Wegner (1998), close to 80% were aware that ADHD was a biological abnormality, however 11% believed it was the result of environmental factors (138). These teachers' perceptions of the causal factors of ADHD highlight the complexity of the aetiology of the disorder, and as described in Chapter 1, epigenetics plays a role in this as opposed to ADHD being a straight-forward Mendelian inheritance pattern. Family, twin, and adoption studies have convincing findings suggesting that a genetic cause may play a role in ADHD, and ADHD susceptibility genes have been described (38), and it is more common in first degree relatives. If the teachers have never learnt this, or they have not been exposed to family members with obvious ADHD symptoms, it is unlikely they would know this answer. ADHD being a lifelong disorder is very well-understood by the Independent teachers. 94.7% of teachers were aware of the correct answer. The Alexandra group did very well too with 66% of them answering this correctly (10).

Children with ADHD seem to have better behaviour in novel situations, and many Independent School Teachers didn't know this. This seems to be true of the other South African studies too. Twenty-six teachers in the current study circled the 'Don't Know' option. The Alexandra study participants had even lower scores with only 5% getting this correct (10), and Perold (2010) also found that teachers did not answer this item well (5). Behavioural difficulties in children with ADHD are often not as evident in novel situations, and this is especially the case when the tasks at hand are interesting, easy and repetitive (139).

Most of the Independent School Teachers knew that there were no physical features associated with ADHD. This highlights their understanding that ADHD is based on behavioural symptoms as opposed to physically discerning features. In cross-sectional study by Sciutto (2016), an overall lower number answered incorrectly, with 28 percent of teachers across all countries believing that ADHD has specific physical features that are identifiable during a medical examination (11).

Most Independent School Teachers knew that the prevalence of ADHD differs between boys and girls with just over half the group of independent teachers getting the correct answer. The presentation may appear different as boys with ADHD may often display significant behavioural problems in the classroom, while girls may appear inattentive and be considered mildly more disruptive than the other children in the class (64). In comparison, only 33% of the Alexandra township teachers were aware of this (10).

Two thirds of the Independent School Teachers answered that ADHD symptoms are more obvious in the classroom than in a free play environment. This question was answered relatively well in the research by Lazarus (2013), Perold (2010) and Topkin (2015) (10)(5)(122), and was in fact the question that had the highest overall score in these three studies. Teachers seem to be aware that a more structured environment is difficult for these children, and their ADHD features are thus more obvious in the classroom (115).

ADHD-like behaviour being displayed in children from chaotic environments was correctly answered by less than half of this group. A child's behaviour may be symptomatic of a disordered home or school environment, and unrelated to an underlying neurological disorder (138). If teachers are not aware that conflict in the home may result in a child behaving in a similar way to that of a child with ADHD, an incorrect diagnosis and recommendation regarding treatment may be provided to parents.

The overall mark for the *symptoms* section was 80% for the Independent School Teachers, the section that was answered best in the study. Several other studies support this concept that educators are knowledgeable in this particular area of ADHD. This was seen with the research by Lazarus (2013) and Perold (2010) which also showed the treatment section as having the highest overall mark (10) (5). This has been proven previously where Economou (2002) proved that educators were able to identify both ADHD clusters, the hyperactive and the inattentive groups (140).

Kern (2015) too illustrated that the majority of educators in her study could identify ADHD behaviour and also understand ADHD symptoms (8). In Kimberley, the result in this section of the KADDS was over 60% which was the highest total of the 3 sections in that study (122). It makes sense that teachers would know more about ADHD symptoms than the associated features of ADHD and the treatment for this condition. Teachers are seeing these children in the classroom setting and observing their behaviour (106). They also have other children in the classroom who act as controls who they can compare these children to. A teachers' role is not making a diagnosis, or advising about treatment (106). Knowledge of the associated features of ADHD such as its prevalence, the genetic link, and adult diagnosis of ADHD would be advantageous to these teachers, however, their major function with this type of child would be to notice aberrant behaviour in their classroom, alert parents to this, and support these children and their families (132).

The current study showed that the vast majority of independent School Teachers were well-aware that being unable to sit still was an ADHD feature, and once again most of the Independent teachers (more than 90% in this case) knew about the different clusters of ADHD. These behavioural symptoms are well-known to teachers, with both local and international studies showing similar results. The group of teachers examined by Topkin (2015) had high results too with over 80% being aware that these children fidget and squirm in their seats (136). Most of the teachers in Kern's study (2015) knew that a child must be inattentive and/or hyperactive/impulsive for a diagnosis of ADHD to be made (8). Over 75% of the respondents in the research by Perold (2010) were able to identify the symptoms of distractibility, fidgeting, disorganization, as well as of the primary clusters of symptoms of ADHD (5). The majority of Independent School Teachers were aware that disorganised behaviour is part of ADHD. This was also well-answered by the Alexandra township teachers too with most of them attaining the correct answer (10). The results showed that teachers had extensive knowledge about the core symptoms of ADHD, which is most likely due to the fact that poor attention span, impulse control and elevated activity level all interfere with classroom activity (53).

The Independent School Teachers scored an overall mark of 63% in the *treatment* section which was answered better than the *associated features* section, but this group never answered this section as well as the *symptoms* section. West had similar findings where teachers knew more about the causes of ADHD, less so about the features associated with ADHD, and the least about the treatment of ADHD (141). In the research by Lazarus (2013), the Alexandra group scored the lowest in the *treatment* subscale (10). The group of teachers from Kimberley answered less than half of this section correctly (122).

When examining certain questions in this section, the vast majority of Independent School Teachers were aware that a certain parenting style did not cause ADHD. 42% of the teachers in a previous Johannesburg study including private and public school teachers indicated that they felt “inadequate” parenting may be the cause ADHD (8). However, as described in Chapter 1, research has not found poor parenting to be an aetiological cause, rather it may exacerbate the condition (142).

Only a quarter of the Independent School Teachers answered correctly that anti-depressants may be used to treat ADHD. They were unaware that antidepressants serve as serotonin, noradrenaline and dopamine agonists and modulate higher cortical functions, including attention, cognition, and executive function (143). Less than half of the Alexandra township teachers got this answer correct (10). The side effects of the medication commonly used for ADHD were generally well understood and the majority of the Independent teachers answered this correctly. Comparatively, this question was failed overall by the Alexandra teachers (10). However, the focus group of Independent School Teachers highlighted some gaps in teachers’ knowledge around medication. This included how the medication can be administered, which capsules may be opened, as well as which side effects are caused by the medication versus those pre-existing conditions that the medicine may exacerbate. This information, possibly incorrect, may be passed on to the parents (106).

The effect of sugar and preservatives on ADHD behaviour was only answered correctly by less than a third of the Independent School Teachers. In the Alexandra study, only 7% answered this correctly (10). Sugar and its association with hyperactivity was endorsed by a high percentage of teachers in worldwide in various studies (119) (5). Across countries, up to 40% of the teachers felt that sugar elimination diets are effective for reducing ADHD-type behaviour, this belief was particularly high amongst South African and German teachers. This is one of the most commonly held misperceptions about ADHD (11). A Saudi Arabian study showed that teachers held views that diet did play a role in ADHD (114). This has not been supported by the current body of scientific evidence, and teachers' views may be incorrectly shared with parents (144). Brandeis (2013), in a huge meta-analysis on the impact of dietary restrictions and behavioural techniques effecting ADHD behaviour, highlights that ADHD studies often involve an assessment of a main caregiver. Their preconceived ideas surrounding ADHD may have an enormous influence on how behaviour is viewed following some type of intervention. If the parent or teacher, for example, has employed a great deal of time and effort into certain behavioural techniques, he will most likely provide scores that suggest this intervention has been effective. Also, if the caregiver or teacher has very strong beliefs that colourants impact behaviour for example, this too will be expressed in an assessment (53). Therefore the trials in this meta-analysis selected were those using blinded-assessments, whereby it was unknown if a placebo had been used, or the assessor was unaware of what intervention had been provided for the child (53). The results showed no statistical significance when specific elimination diets were implemented or food colourants were reduced (53).

The Independent School Teachers did well on the question which explored the efficacy of combined treatment of medication and behaviour techniques. Behavioural interventions, particularly those based on positive reinforcement and punishment, have been found to be effective in improving behaviour in the classroom (145). This question was also answered well by two thirds of the Alexandra teachers (10). Glass and Wegar (2000) similarly found that for the vast majority of their group of teachers the treatment of choice was a combination of pharmacology and behaviour techniques (138). One such technique, that of administering punishment, is not effective in the management of ADHD. This was answered correctly by almost all of

the Independent teachers who knew that it was not a good choice. Positive reinforcement was found to be helpful, and common examples of reinforcement used by teachers effectively to change behaviour included a word of praise, a smile, or the offer of some extra play time for good behaviour (106). Ninety percent of the teachers in Kerns' study said that they employed a system of rewards to encourage better behaviour (8).

Electroconvulsive therapy as a form of treatment for ADHD was only answered correctly by a third of the Independent School Teachers. The majority of teachers circled 'I don't know'. ECT has very rarely been used in ADHD, and this has been to treat co-morbid conditions such as severe depression (146). Similarly in the Kimberley study, 74% of teachers answered 'I don't know' (136). Vereb (2004) found that the more knowledge an educator had about a particular treatment or behavioural intervention, the more likely he would consider the intervention to be acceptable, and thus encourage its usage (147). Limited knowledge as well as misperceptions surrounding ADHD treatment amongst educators is cause for concern as expressed by Efron (2008), as teachers play a key role in the identifying, managing and treating ADHD (148)

Stimulant medication's role in later substance abuse was answered correctly by only half of the Independent School Teachers, with a large proportion answering that they didn't know the answer. The concern of teachers having a misunderstanding of ADHD medication and the perception that it may lead to drug abuse behaviour may cause teachers to offer incorrect advice to families. For example, teachers may suggest to parents that a child should try an exclusionary diet to manage symptoms because ADHD medication may lead to harmful behaviour (11).

The question regarding inflexibility and adherence to rituals was only answered correctly by a third of the Independent School Teachers. These are symptoms of Autism Spectrum Disorder. If these symptoms are mistaken as ADHD this may have ramifications when it comes to offering advice to parents and managing these

children in the classroom (149). Also, important measures necessary to manage ASD behaviour may be delayed. Sciutto (2016) suggested that any behaviour that is viewed as different or unacceptable may possibly be considered to be ADHD by some teachers (11).

5.1 Confidence in teaching children with ADHD

In this study, only 4 teachers felt unconfident to teach children with ADHD. Two of these teachers were over 50 years old and had taught for many years, while the two other teachers were far younger and had less teaching experience. All 4 of these teachers passed the questionnaire overall. This suggests that experience may not always instil a sense of confidence, however other studies have shown that an increased level of confidence is associated with more knowledge about ADHD (11). Confidence in teaching these children does not always translate into a positive attitude about educating these children, and some teachers expressed pessimism about their success in teaching these learners (150). Rizzo (1991) found the opposite, with his research showing that the more competent a teacher felt, the more favourable her attitude was regarding teaching these students (151).

5.2 Years of teaching

Previous studies found that the longer one teaches for, the more knowledge she has about ADHD, as was the case with Canadian teachers (119) and US primary school teachers (11). The current study showed no association between years of teaching and ADHD knowledge. This was also found with other research, such as a sample of American teachers studies by Jerome (1994) (119) and the group of Australian teachers examined by Kos (2008) (106) where there was no correlation between ADHD knowledge and years of teaching experience. Similarly, in the Korean study that was part of the cross-sectional study on ADHD, years of teaching was negatively associated with ADHD knowledge (11). This is an interesting finding as it suggests that experience may not be adequate when it comes to noticing ADHD symptoms and being knowledgeable about the condition. Ongoing ADHD training should thus be available, and certainly necessary, to optimise knowledge on this topic.

5.3 Exposure to ADHD children

Better knowledge of ADHD has been linked to more exposure of ADHD children (106) (5). This study found that teachers' knowledge of ADHD in all 3 categories being examined, *associated features*, *symptoms* and *treatment*, were superior when they had taught children with ADHD as opposed to those who had not previously taught children with ADHD. Teachers who reported having prior exposure to children with ADHD had total knowledge scores that were far higher than teachers without limited exposure to ADHD pupils (11). Sciutto (2016) also found that the number of pupils taught over a teachers' career was associated with a better overall ADHD knowledge (11). This finding was not evident in research by Kos (2008) (106).

5.4 Training

More training has been associated with better knowledge about ADHD (106) (5) (141). The current study showed that teachers who attended workshops had better knowledge of ADHD symptoms as opposed to teachers who hadn't attended any workshops. This is in keeping with international findings, such in Nigeria when an ADHD training program was implemented and resulted in a statistically significant rise in knowledge and the behavioural management of ADHD, as well as improved attitude towards affected children (120). Kos (2008) found that training correlated with a better knowledge on ADHD (103). This current research also found an association between workshop attendance and ADHD articles read.

5.5 Reading ADHD articles

The current study showed significant differences in detecting ADHD symptoms by those teachers who had read more ADHD articles as opposed to those who had read fewer articles. Sciutto *et al* (2016) also found a correlation between reading professional literature on ADHD and level of knowledge (11), and this finding was consistent with research by Perold (2010) (5).

5.6 Knowledge of someone with ADHD

Sciutto (2016) found an association between having a family member or friend with ADHD and greater knowledge of ADHD in terms of symptoms, diagnosis and treatment options (11). This cohort of teachers had more knowledge about ADHD treatment when they knew someone outside the classroom who had ADHD.

5.7 Limitations of the study

Of the 26 schools who were approached, only 9 agreed to participate. This begs the question why those schools refused to participate. Was it simply because the principals felt the teachers were too busy and did not have the time? Or perhaps those schools do not have regular ADHD training and the results would show this. Did those schools who participated have a greater interest in the topic, and as such encourage their staff to keep up to date on the subject? Furthermore, as only 9 schools ended up participating in this study, a possible limitation may be that this sample is not representative enough of all Independent schools.

Participation in this study was voluntary. A purposive, non-probability sampling method was used. This sample does not fully represent the population of Independent Foundation Phase teachers as those who responded had chosen to do so. Also, participants in this study were all female. Only schools in a certain geographic location were selected for this research, and with the participants all being female this study was rendered both small and narrow. Thus, generalisability was a concern, and widespread conclusions about Independent school Foundation Phase teachers' knowledge on ADHD may not be possible from this study.

The KADDS was designed in 2000. Some developments in ADHD research have subsequently resulted in new knowledge on the topic, as well as guideline changes. Whereas the DSM IV made an ADHD diagnosis by age 7 (30), the DSM 5 has now broadened to include children up to 12 years old (13). The answer regarding age of

diagnosis would have been true if the KADDS was administered with the DSM IV, however it is now false as the age has changed in the DSM 5. Furthermore, the answer regarding the features of autism is also dependent on which DSM is utilised. The DSM IV clearly stated that an ADHD diagnosis could not be made if autism was present (14). The new DSM 5 allows both these diagnoses to co-exist in one patient so the answer is not as clear as when the previous DSM was used.

The question regarding behaviour in children of 4 years old is complex. The number of pre-school children with an ADHD diagnosis has doubled over the past 10 years, proving that there is a possibility that ADHD-type behaviour can be observed in very young children and it differs from their neuro-atypical peers. This is seen with the AAP including this very young group in their stratification system for managing young children with ADHD (152).

Workshop attendance was a variable which was used with the purpose of showing that workshops are associated with better knowledge of ADHD. Sciutto (2016) highlights two issues with using this as a variable to illustrate level of knowledge (11). Firstly, the specific nature of the training programs wasn't explored at all. And secondly, a training program may not address certain key aspects. By doing this, it may prove to be a less effective program, or potentially even inadvertently allow certain misconceptions to be strengthened as inaccurate beliefs held by participants are not addressed or rectified (11). Training programs may skew the relevance of certain concepts, with those topics that are not fully covered being understood to be somewhat less important (11).

5.8 Recommendations for future research

A follow-up study could entail using Independent Foundation Phase teachers once again. However, unlike this current study, a measurement could be instituted and implemented before and after ADHD training. A program focusing on the main areas of ADHD that are pertinent to teachers could be developed. Another aspect which

could be incorporated into future research would be teachers who are opposed to the use of ADHD medication and their views on alternative medications such as herbal remedies, and the impact this would have on children with an ADHD diagnosis.

CHAPTER 6

CONCLUSION

The main aim of this study was to assess the knowledge and perceptions of Foundation Phase teachers at Independent Schools in Johannesburg. As studies had previously been done in government schools or a combination of both private and public schools, this was the first South African study using this particular population of teachers.

Information was gathered using a demographic questionnaire, a standardised tool, the KADDS, and a focus group was held to enrich the information gathered.

The conclusions are summarised below:

These independent school teachers' overall score was one of the best compared to previous research using the KADDS both internationally and locally.

These teachers had very good knowledge when it came to the symptoms of ADHD, they had a fair understanding about treatment for ADHD, and their knowledge about the associated features of ADHD was limited. These findings are very encouraging as, in my opinion, this highlights that this group of teachers have been exposed to relevant information about ADHD. These teachers are aware of the symptoms that present in the condition, the challenges that these children may face, they seem to overall have some understanding of how to manage these children in the class environment.

Exposure to children with ADHD resulted in teachers having the most knowledge in terms of recognising symptoms of ADHD, being aware about features that are associated with ADHD, and the medication and behavioural interventions that are available and effective.

Years of experience was not associated with a greater knowledge about ADHD.

Knowledge of a family member or friend outside the school with ADHD was found to be advantageous to this group of teachers in terms of their understanding of the available treatments for ADHD.

Workshops about ADHD as well as reading material related to ADHD is beneficial to teachers' overall knowledge of the condition as compared to those who had read fewer articles and attended less workshops. Workshop attendance and ADHD articles read was found to be an association.

As ADHD prevalence is at its highest, and children are often being diagnosed in the Foundation Phase due to the increased demand to sit attentively for longer periods of time, regular workshops should be available for Foundation Phase teachers. This study, as with other bodies of research, has shown that ongoing training is effective in improving teachers' understanding of the condition, recognising ADHD symptoms as well as providing tools for managing these children in the classroom.

CHAPTER 7

REFERENCES

1. Joseph J, Psy D. International Consensus Statement. 2002;1389–97.

2. Consultation DFOR. Attention deficit hyperactivity disorder : diagnosis and management. 2017;(September):1–93.

3. Schellack N. The management of attention- deficit hyperactivity disorder in children : Updated 2017. 2017;84(4).

4. Nel M, Engelbrecht P, Nel N, Tlale D. South African teachers' views of collaboration within an inclusive education system. Int J Incl Educ. 2014;18(9):903–17.

5. Perold M, Louw C, Kleynhans S. Primary school teachers' knowledge and misperceptions of attention deficit hyperactivity disorder (ADHD). South African J Educ. 2010;30(3):0.

6. Sayal K, Goodman R, Ford T. Barriers to the identification of children with attention deficit/hyperactivity disorder. J Child Psychol Psychiatry. 2006;47(7):744–50.

7. Kern A, Seabi J. Educators ' Perceptions of Attention Deficit Hyperactivity Disorder : An. J Psychol Africa. 2008;18(4):641–4.

8. Kern A, Amod Z, Seabi J, Vorster A. South African foundation phase teachers' perceptions of ADHD at private and public schools. Int J Environ Res Public Health. 2015;12(3):3042–59.

9. Eloff I, Engelbrecht P, Pettipher OR, Swart RE. Implementing inclusive education in South Africa: Teachers' attitudes and experiences. Acta Acad. 2002;34(1):175–89.

10. Lazarus KJ. The knowledge and perceptions of Attention Deficit Hyperactivity Disorder held by foundation phase educators in a Township in Gauteng. 2013.

11. Sciutto MJ, Terjesen MD, Kučerová A, Michalová Z, Schmiedeler S,

Antonopoulou K, et al. Cross-national comparisons of teachers' knowledge and misconceptions of ADHD. Int Perspect Psychol Res Pract Consult. 2016;5(1):34.

12. Perold H, Louw C, Kleynhans S. Primary school teachers' knowledge and misperceptions of attention deficit hyperactivity disorder (ADHD). South African J Educ. 2010;30(3):457-473.

13. Association AP. Diagnostic and statistical manual of mental disorders (DSM-5®). American Psychiatric Pub; 2013.

14. Epstein JN, Loren REA. Changes in the definition of ADHD in DSM-5: subtle but important. Neuropsychiatry (London). 2013;3(5):455.

15. Zalsman G, Shilton T, Zalsman G, Shilton T. Adult ADHD : A new disease ? 2016;1501.

16. Matza LS, Paramore C, Prasad M. A review of the economic burden of ADHD. Cost Eff Resour Alloc. 2005;3:1–9.

17. Reaves C. What is ADHD? 2017;

18. Mahomedy Z, Van der Westhuizen D, Van der Linde MJ, Coetsee J. Persistence of attention deficit/hyperactivity disorder into adulthood: a study conducted on parents of children diagnosed with attention deficit/hyperactivity disorder. South African J Psychiatry. 2007;10(1).

19. Miller CJ, Marks DJ, Miller SR, Berwid OG, Kera EC, Santra A, et al. Brief report: Television viewing and risk for attention problems in preschool children. J Pediatr Psychol. 2006;32(4):448–52.

20. Stevens T, Mulsow M. There is no meaningful relationship between television exposure and symptoms of attention-deficit/hyperactivity disorder. Pediatrics. 2006;117(3):665–72.

21. Gaventa B. A Review of "Esau's Blessing: How the Bible Embraces Those with Special Needs" Ora Horn Prouser. Taylor & Francis; 2013.

22. Baird J, Stevenson JC, Williams DC. The evolution of ADHD: a disorder of

communication? Q Rev Biol. 2000;75(1):17–35.

23. Martinez-Badía J. Who says this is a modern disorder? The early history of attention deficit hyperactivity disorder. World J Psychiatry [Internet]. 2015;5(4):379. Available from: http://www.wjgnet.com/2220-3206/full/v5/i4/379.htm

24. Rowland AS, Skipper BJ, Umbach DM, Rabiner DL, Campbell RA, Naftel AJ, et al. HHS Public Access. J Atten Disord. 2015;19(9):741–54.

25. McCarthy S, Wilton L, Murray ML, Hodgkins P, Asherson P, Wong ICK. The epidemiology of pharmacologically treated attention deficit hyperactivity disorder (ADHD) in children, adolescents and adults in UK primary care. BMC Pediatr. 2012;12(1):78.

26. Polanczyk G V., Willcutt EG, Salum GA, Kieling C, Rohde LA. ADHD prevalence estimates across three decades: An updated systematic review and meta-regression analysis. Int J Epidemiol. 2014;43(2):434–42.

27. Fayyad J, De Graaf R, Kessler R, Alonso J, Angermeyer M, Demyttenaere K, et al. Cross-national prevalence and correlates of adult attention-deficit hyperactivity disorder. Br J Psychiatry. 2007;190(5):402–9.

28. Pelham William E J, Fabiano GA, Massetti GM. Evidence-based assessment of attention deficit hyperactivity disorder in children and adolescents. J Clin Child Adolesc Psychol. 2005;34(3):449–76.

29. Timimi S. A critique of the international consensus statement on ADHD. Clin Child Fam Psychol Rev. 2004;7(1):59–63.

30. Willcutt EG. The prevalence of DSM-IV attention-deficit/hyperactivity disorder: a meta-analytic review. Neurotherapeutics. 2012;9(3):490–9.

31. Aase H, Meyer A, Sagvolden T. Moment-to-moment dynamics of ADHD behaviour in South African children. Behav Brain Funct. 2006;2(1):11.

32. Gualtieri CT, Johnson LG. ADHD: Is objective diagnosis possible? Psychiatry (Edgmont). 2005;2(11):44.

33. Sciutto MJ, Eisenberg M. Evaluating the Evidence For and Against the Overdiagnosis of ADHD. J Atten Disord [Internet]. 2007 May 9;11(2):106–13. Available from: https://doi.org/10.1177/1087054707300094

34. Follan M, Anderson S, Huline-dickens S, Lidstone E, Young D, Brown G, et al. Research in Developmental Disabilities Discrimination between attention deficit hyperactivity disorder and reactive attachment disorder in school aged children. 2011;32:520–6.

35. Thomas R, Sanders S, Doust J, Beller E. Prevalence of Attention-De fi cit / Hyperactivity Disorder : A Systematic Review and Meta-analysis. 2019;135(4).

36. Xu G, Strathearn L, Liu B, Yang B, Bao W. Twenty-Year Trends in Diagnosed Attention-Deficit/Hyperactivity Disorder Among US Children and Adolescents, 1997-2016. JAMA Netw Open [Internet]. 2018;1(4):e181471. Available from: http://jamanetworkopen.jamanetwork.com/article.aspx?doi=10.1001/jamanetworkopen.2018.1471

37. Efron D. Can We Really Suggest that Anesthesia Might Cause. 2017;(2):10–2.

38. Faraone S V., Larsson H. Genetics of attention deficit hyperactivity disorder. Mol Psychiatry. 2018;1–14.

39. Adams PF, Kirzinger WK, Martinez M. Summary health statistics for the U.S. population: National Health Interview Survey, 2012. Vital Health Stat 10 [Internet]. 2013;(259):1–95. Available from: http://www.ncbi.nlm.nih.gov/pubmed/24784762

40. Bonvicini C, Faraone S V., Scassellati C. Attention-deficit hyperactivity disorder in adults: A systematic review and meta-analysis of genetic, pharmacogenetic and biochemical studies. Mol Psychiatry [Internet]. 2016;21(7):872–84. Available from: http://dx.doi.org/10.1038/mp.2016.74

41. US Food and Drug Administration. FDA NEWS RELEASE. FDA issues warning letter to genomics lab for illegally marketing genetic test that claims to predict patients' responses to specific medications. 2019;April. Available from: https://www.fda.gov/news-events/press-announcements/fda-issues-warning-letter-genomics-lab-illegally-marketing-genetic-test-claims-predict-patients

42. Training PS, Bolat H. Attention-Deficit / Hyperactivity Disorder and Very Preterm / Very Low Birth Weight : A Meta-analysis. 2017;(December).

43. Miller M, Hinshaw SP. Attention-Deficit/Hyperactivity Disorder. Encycl Ment Heal Second Ed. 2015;387:116–23.

44. Instanes JT, Halmøy A, Engeland A, Haavik J, Furu K, Klungsøyr K. Attention-Deficit/Hyperactivity Disorder in Offspring of Mothers With Inflammatory and Immune System Diseases. Biol Psychiatry [Internet]. 2017;81(5):452–9. Available from: http://dx.doi.org/10.1016/j.biopsych.2015.11.024

45. Modesto T, Tiemeier H, Peeters RP, Jaddoe V V., Hofman A, Verhulst FC, et al. Maternal mild thyroid hormone insufficiency in early pregnancy and attention-deficit/hyperactivity disorder symptoms in children. JAMA Pediatr. 2015;169(9):838–45.

46. Kosidou K, Dalman C, Widman L, Arver S, Lee BK, Magnusson C, et al. Maternal Polycystic Ovary Syndrome and Risk for Attention-Deficit/Hyperactivity Disorder in the Offspring. Biol Psychiatry [Internet]. 2017;82(9):651–9. Available from: http://dx.doi.org/10.1016/j.biopsych.2016.09.022

47. Kissgen R, Franke S. ADHS im Fokus der Bindungsforschung. Neuropsychiatrie. 2016;30(2):63–8.

48. Norvilitis JM, Fang P. Perceptions of ADHD in China and the United States: A preliminary study. J Atten Disord. 2005;9(2):413–24.

49. Halperin JM, Bédard A-C V, Curchack-Lichtin JT. Preventive interventions for ADHD: a neurodevelopmental perspective. Neurotherapeutics. 2012;9(3):531–41.

50. Vizzini L, Popovic M, Zugna D, Vitiello B, Trevisan M, Pizzi C, et al. Maternal anxiety, depression and sleep disorders before and during pregnancy, and preschool ADHD symptoms in the NINFEA birth cohort study. Epidemiol Psychiatr Sci. 2018;1–11.

51. Thapar A, Cooper M, Eyre O, Langley K. Practitioner review: What have we learnt about the causes of ADHD? J Child Psychol Psychiatry Allied Discip.

2013;54(1):3–16.

52. Efron D, Vutskits L, Davidson AJ. Can We Really Suggest that Anesthesia Might Cause Attention-deficit/Hyperactivity Disorder? Anesthesiol J Am Soc Anesthesiol. 2017;127(2):209–11.

53. Brandeis D, Ph D, Cortese S, Ph D, Daley D, Ph D, et al. Nonpharmacological Interventions for ADHD: Systematic Review and Meta-Analyses of Randomized Controlled Trials of Dietary and Psychological Treatments. 2013;(March):275–89.

54. Elder TE. NIH Public Access. 2011;29(5):641–56.

55. Guideline CP. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. Pediatrics. 2011;128(5):1007–22.

56. Shaw P, Eckstrand K, Sharp W, Blumenthal J, Lerch JP, Greenstein D, et al. Attention-deficit/hyperactivity disorder is characterized by a delay in cortical maturation. Proc Natl Acad Sci. 2007;104(49):19649–54.

57. Dias TGC, Kieling C, Graeff-Martins AS, Moriyama TS, Rohde LA, Polanczyk G V. Developments and challenges in the diagnosis and treatment of ADHD. Rev Bras Psiquiatr. 2013;35(SUPPL. 1):40–50.

58. Barkley RA, Edwards G. Diagnostic interview, behavior rating scales, and the medical examination. Attention-deficit Hyperact Disord A Handb diagnosis Treat. 1998;263–93.

59. Caye A, Caye A, Machado JD, Rohde LA. Evaluating Parental Disagreement in ADHD Diagnosis : Can We Rely on a Single Evaluating Parental Disagreement in ADHD Diagnosis : Can We Rely on a Single Report From Home ? 2013;(May 2016).

60. Langberg JM, Simon JO, Loren REA, Arnold LE, Hechtman L, Hinshaw SP, et al. Parental agreement on ADHD symptom-specific and broadband externalizing ratings of child behavior. J Emot Behav Disord. 2010;18(1):41–50.

61. Bruchmu K, Schneider S. Is ADHD Diagnosed in Accord With Diagnostic Criteria ? Overdiagnosis and Influence of Client Gender on Diagnosis. 2012;80(1):128–38.

62. Morgan PL, Staff J, Hillemeier MM, Farkas G, Maczuga S. Racial and Ethnic Disparities in ADHD Diagnosis From Kindergarten to Eighth Grade. Pediatrics [Internet]. 2013;132(1):85–93. Available from: http://pediatrics.aappublications.org/cgi/doi/10.1542/peds.2012-2390

63. Anne MP, Ullebø K, Gillberg C, Johansen A, Sdq DÁKÁAÁ. Influence of assessment instrument on ADHD diagnosis. 2014;197–205.

64. Jensen PS, Hinshaw SP, Swanson JM, Greenhill LL, Conners CK, Arnold LE, et al. Findings from the NIMH Multimodal Treatment Study of ADHD (MTA): implications and applications for primary care providers. J Dev Behav Pediatr. 2001;22(1):60–73.

65. Haggerty KP, McGlynn-Wright A, Klima T. Promising parenting programs for reducing adolescent problem behaviors. J Child Serv. 2013;8(4).

66. Jensen PS, Hinshaw SP, Kraemer HC, Lenora N, Newcorn JH, Abikoff HB, et al. ADHD comorbidity findings from the MTA study: comparing comorbid subgroups. J Am Acad Child Adolesc Psychiatry. 2001;40(2):147–58.

67. Heijer AE Den, Groen Y, Tucha L, Fuermaier ABM, Koerts J, Lange KW, et al. Sweat it out ? The effects of physical exercise on cognition and behavior in children and adults with ADHD : a systematic literature review. J Neural Transm. 2017;124(s1):3–26.

68. Holmes J, Gathercole SE, Place M, Dunning DL, Hilton KA, Elliott JG. Working memory deficits can be overcome: Impacts of training and medication on working memory in children with ADHD. Appl Cogn Psychol. 2010;24(6):827–36.

69. Ziereis S, Jansen P. Effects of physical activity on executive function and motor performance in children with ADHD. Res Dev Disabil. 2015;38:181–91.

70. Gapin JI, Labban JD, Etnier JL. The effects of physical activity on attention deficit hyperactivity disorder symptoms: The evidence. Prev Med (Baltim).

2011;52:S70–4.

71. Attentiondeficit/Hyperactivity-Disorder S on. Clinical Practice Guideline ADHD : Clinical Practice Guideline for the Diagnosis , Evaluation , and Treatment of Attention-Deficit / Hyperactivity Disorder in Children and Adolescents. Am Acad Pediatr. 2011;128(5):18.

72. Pisecco S, Huzinec C, Curtis D. The effect of child characteristics on teachers' acceptability of classroom-based behavioral strategies and psychostimulant medication for the treatment of ADHD. J Clin Child Psychol. 2001;30(3):413–21.

73. Coeytaux RR, Maslow GR, Davis N, Goode AP, Namdari B, Lapointe NMA, et al. Nonpharmacologic Treatments for Attention-Deficit / Hyperactivity Disorder : A Systematic Review. 2018;141(6).

74. Taylor E, Sergeant J, Doepfner M, Gunning B, Overmeyer S, Möbius H-J, et al. Clinical guidelines for hyperkinetic disorder. Eur Child Adolesc Psychiatry. 1998;7(4):184–200.

75. Pharmacology C. Ritalin LA ®.

76. Of H, Information P, Use O, Approval IUS, Ideationchildrenadolescents S, Symptoms EC, et al. Reference ID : 2914553. 2002;

77. Lin DY, Kratochvil CJ, Xu W, Jin L, D'Souza DN, Kielbasa W, et al. A randomized trial of edivoxetine in pediatric patients with attention-deficit/hyperactivity disorder. J Child Adolesc Psychopharmacol. 2014;24(4):190–200.

78. Cortese S, Coghill D. Twenty years of research on attention-deficit/hyperactivity disorder (ADHD): looking back, looking forward. Evid Based Ment Health. 2018;21(4):173–6.

79. Pliszka SR, Crismon ML, Hughes CW, Corners CK, Emslie GJ, Jensen PS, et al. The Texas Children's Medication Algorithm Project: revision of the algorithm for pharmacotherapy of attention-deficit/hyperactivity disorder. J Am Acad Child Adolesc Psychiatry. 2006;45(6):642–57.

80. Bachmann CJ, Wijlaars LP, Kalverdijk LJ, Burcu M, Glaeske G, Schuiling-veninga CCM, et al. Trends in ADHD medication use in children and adolescents in fi ve western countries , 2005 – 2012. Eur Neuropsychopharmacol [Internet]. 2017;27(5):484–93. Available from: http://dx.doi.org/10.1016/j.euroneuro.2017.03.002

81. Banaschewski JGT, Coghill JBD, Dittmann MDRW. European guidelines on managing adverse effects of medication for ADHD. 2011;17–37.

82. Abrego K, Champsi A, Gabra M, Zaza A. More Focus Less Growth. 2017;46(2007):3110.

83. Bowling A. Obesity ADHD Medication , Dietary Patterns , Physical Activity , and BMI in Children : A Longitudinal Analysis of the ECLS-K Study. 2017;25(10):1802–8.

84. Rothenberger A, Roessner V, Banaschewski T, Leckman JF. Co-existence of tic disorders and attention-deficit/hyperactivity disorder-recent advances in understanding and treatment. Springer; 2007.

85. Ross M, Bridges JFP, Ph D, Ng X, Pharm BS, Wagner LD, et al. A Best-Worst Scaling Experiment to Prioritize Caregiver Concerns About ADHD Medication for Children. 2015;(February).

86. Quinn PD, Ph D, Chang Z, Ph D, Hur K, Ph D, et al. ADHD Medication and Substance-Related Problems. 2017;(September):877–85.

87. Dalsgaard S, Nielsen HS, Simonsen M. Consequences of ADHD Medication Use for Children’s Outcomes. 2014;

88. Maier LJ, Ferris JA, Winstock AR. International Journal of Drug Policy Pharmacological cognitive enhancement among non-ADHD individuals — A cross-sectional study in 15 countries. Int J Drug Policy. 2018;58(April 2016):104–12.

89. Franchi JM, Hospitalier C, Bordeaux U De, Fond G. A preliminary study on cognitive enhancer French Medicine and Pharmacology students. 2014;(July).

90. Fond G, Gavaret M, Vidal C, Brunel L, Riveline J-P, Micoulaud-Franchi J-A, et

al. (Mis) use of prescribed stimulants in the medical student community: motives and behaviors: a population-based cross-sectional study. Medicine (Baltimore). 2016;95(16).

91. Dan O, Raz S. The relationships among ADHD, self-esteem, and test anxiety in young adults. J Atten Disord. 2015;19(3):231–9.

92. Mazzone L, Postorino V, Reale L, Guarnera M, Mannino V, Armando M, et al. Self-esteem evaluation in children and adolescents suffering from ADHD. Clin Pract Epidemiol Ment Heal CP EMH. 2013;9:96.

93. Fraser A, Cooper M, Agha SS, Collishaw S, Rice F, Thapar A, et al. The presentation of depression symptoms in attention-deficit/hyperactivity disorder: comparing child and parent reports. Child Adolesc Ment Health. 2018;23(3):243–50.

94. Walker S, Venter A, van der Walt A, Esterhuyse KGF. Prevalence of attention-deficit/hyperactivity disorder (ADHD) symptomatology and psychiatric co-morbidity among adolescents diagnosed with ADHD in childhood. South African J Psychiatry. 2011;17(1).

95. Mannuzza S, Klein RG. Long-term prognosis in attention-deficit/hyperactivity disorder. Child Adolesc Psychiatr Clin. 2000;9(3):711–26.

96. Barbaresi WJ, Colligan RC, Weaver AL, Voigt RG, Killian JM, Katusic SK. Mortality, ADHD, and psychosocial adversity in adults with childhood ADHD: a prospective study. Pediatrics. 2013;131(4):637–44.

97. McCarthy S, Wilton L, Murray ML, Hodgkins P, Asherson P, Wong ICK. Persistence of pharmacological treatment into adulthood, in UK primary care, for ADHD patients who started treatment in childhood or adolescence. BMC Psychiatry. 2012;12(1):219.

98. Weiss MD, Alliance CH. Clinical Recommendations in Current Practice Guidelines for Diagnosis and Treatment of ADHD in Adults. 2007;(December 2013).

99. Davis DW, Williams PG. Attention Deficit / Hyperactivity Disorder in Preschool-Age Children : Issues and Concerns. 2011;(Mdr 113).

100. Danielson ML, Visser SN, Gleason MM, Peacock G, Claussen AH, Blumberg SJ. Diagnosis and Treatment Among US Children Aged 2 to 5 Years. 2017;38(7).

101. Zito JM, Safer DJ, Gardner JF, Boles M, Lynch F. Trends in the prescribing of psychotropic medications to preschoolers. Jama. 2000;283(8):1025–30.

102. Halperin JM, Marks DJ. Practitioner Review: Assessment and treatment of preschool children with attention-deficit/hyperactivity disorder. J Child Psychol Psychiatry. 2019;

103. M. Halperin J, J. Marks D. Practitioner Review: Assessment and treatment of preschool children with attention-deficit/hyperactivity disorder. Journal of Child Psychology and Psychiatry. 2019.

104. Schweren LJS, de Zeeuw P, Durston S. MR imaging of the effects of methylphenidate on brain structure and function in attention-deficit/hyperactivity disorder. Eur Neuropsychopharmacol. 2013;23(10):1151–64.

105. Layton TJ, Barnett ML, Hicks TR, Jena AB. Attention Deficit–Hyperactivity Disorder and Month of School Enrollment. N Engl J Med. 2018;379(22):2122–30.

106. Kos J, Richdale A, Hay D. Children with attention deficit hyperactivity disorder and their teachers: A review of the literature. Int J Disabil Dev Educ. 2006;53(2):147–60.

107. Sax L, Kautz KJ. Who first suggests the diagnosis of attention-deficit/hyperactivity disorder? Ann Fam Med. 2003;1(3):171–4.

108. Ohan JL, Cormier N, Hepp SL, Visser TAW, Strain MC. Does Knowledge About Attention-Deficit/Hyperactivity Disorder Impact Teachers' Reported Behaviors and Perceptions? Sch Psychol Q. 2008;23(3):436–49.

109. Amod Z, Vorster A, Lazarus K. World ' s largest Science , Technology & Medicine Open Access book publisher Attention-Deficit / Hyperactivity Disorder (ADHD) as a Barrier to Learning and Development within the South African Context : The Perspective of Teachers.

110. Phillips CB. Medicine goes to school: teachers as sickness brokers for ADHD. PLoS Med. 2006;3(4):e182.

111. Pfiffner LJ, Barkley RA, DuPaul GJ. Treatment of ADHD in school settings. Atten deficit Hyperact Disord A Handb diagnosis Treat. 2006;3:547–89.

112. Gal E, Schreur N, Engel-Yeger B. Inclusion of children with disabilities: Teachers attitudes and requirements for environmental accommodations. Int J Spec Educ. 2010;25(2):89.

113. Canu WH, Mancil EB. An examination of teacher trainees' knowledge of attention-deficit/hyperactivity disorder. School Ment Health. 2012;4(2):105–14.

114. Alkahtani KDF. Teachers' knowledge and misconceptions of attention deficit/hyperactivity disorder. Psychology. 2013;4(12):963.

115. Kos J. What do primary school teachers know, think and do about ADHD? 2008;

116. Jiajing C. EFL Teachers' Knowledge and Perceptions of Students with Attention-Deficit Hyperactivity Disorder. Huagang English Journal, 11 issues 2005. 2005;

117. Kaur G, Nitakumari K. A Descriptive Study to assess the knowledge regarding ADHD among primary school teachers in selected schools of district Mohali with a view to develop informational booklet. Asian J Nurs Educ Res. 2018;8(3):399–402.

118. Arora VK. Concepts and Misperception of School Teachers regarding Attention Deficit Hyperactivity Disorder (ADHD). Train Dev J. 2014;5(2):77–81.

119. Jerome L, Gordon M, Hustler P. A comparison of American and Canadian teachers' knowledge and attitudes towards attention deficit hyperactivity disorder (ADHD). Can J Psychiatry. 1994;39(9):563–7.

120. Lasisi D, Ani C, Lasebikan V, Sheikh L, Omigbodun O. Effect of attention-deficit–hyperactivity-disorder training program on the knowledge and attitudes of primary school teachers in Kaduna, North West Nigeria. Child Adolesc Psychiatry Ment Health. 2017;11(1):15.

121. Youssef MK, Hutchinson G, Youssef FF. Knowledge of and attitudes toward ADHD among teachers: Insights from a Caribbean nation. SAGE Open. 2015;

122. Topkin B. An examination of primary school teachers' knowledge of the symptoms and management of children diagnosed with ADHD in their classrooms. 2013;

123. Ntuli BN. Attitudes of educators towards children with Attention Deficit Hyperactivity Disorder. University of Zululand; 2014.

124. Niglas K. Combining quantitative and qualitative approaches. In: Paper presented at the European Conference on Educational Research. 2000. p. 23.

125. Schmiedeler S. German Teachers' Knowledge and Misconceptions about Attention-Deficit-/Hyperactivity Disorder (ADHD). 2013;60(2):143–53.

126. Graeper KD, Barker KA, Terjesen MD. Knowledge of ADHD Among Vietnamese and American Teachers. Collab Res J Sch Psychol. 2008;1:18–23.

127. Thomas L, MacMillan J, McColl E, Hale C, Bond S. Comparison of focus group and individual interview methodology in examining patient satisfaction with nursing care. Soc Sci Heal. 1995;1(4):206–20.

128. Rabiee F. Focus-group interview and data analysis. 2019;(2004):655–60.

129. Kitzinger J. Qualitative research: introducing focus groups. Bmj. 1995;311(7000):299–302.

130. Soklaridis S. The Process of Conducting Qualitative Grounded Theory Research for a Doctoral Thesis : Experiences and Reflections The Process of Conducting Qualitative Grounded Theory Research for a. 2009;14(4):718–33.

131. Fiske EB, Ladd HF. Balancing Public and Private Resources for Basic Education : School Fees in Post-Apartheid South Africa. 2003;1–35.

132. Kellner R, Houghton S, Douglas G. Peer-related personal experiences of children with attention-deficit/hyperactivity disorder with and without comorbid learning disabilities. Int J Disabil Dev Educ. 2003;50(2):119–36.

133. Bayat A, Louw W, Rena R. The Impact of Socio-economic Factors on the Performance of Selected High School Learners in the Western Cape Province , South Africa. 2014;45(3):183–96.

134. Nel NM, Tlale LDN, Engelbrecht P, Nel M. Teachers ' Perceptions of Education Support Structures in the Implementation. 2016;1–14.

135. Mampane MR, Africa S. Factors contributing to the resilience of middle-adolescents in a South African township : Insights from a resilience questionnaire. 2014;34(4):1–11.

136. Topkin B, Roman NV, Mwaba K. Attention Deficit Disorder (ADHD): Primary school teachers' knowledge of symptoms, treatment and managing classroom behaviour. South African J Educ. 2015;35(2):1–8.

137. Barbaresi WJ, Olsen RD. An ADHD educational intervention for elementary schoolteachers: A pilot study. J Dev Behav Pediatr. 1998;

138. Glass CS, Wegar K. Teacher perceptions of the incidence and management of attention deficit hyperactivity disorder. Education. 2000;121(2).

139. Greene RW. Students with ADHD in school classrooms: Teacher factors related to compatibility, assessment, and intervention. School Psych Rev. 1995;

140. Economou N. Facilitating a distracted mind: Teachers' experience of attention deficit hyperactivity disorder. Unpubl Honours Thesis) Univ Witwatersrand, Johannesburg, South Africa. 2002;

141. West J, Taylor M, Houghton S, Hudyma S. A Comparison of Teachers and Parents Knowledge and Beliefs About Attention-Deficit/Hyperactivity Disorder (ADHD). Sch Psychol Int. 2005;

142. Nel N, Nel M, Hugo A. Learner support in a diverse classroom: A guide for foundation, intermediate and senior phase teachers of language and mathematics. Van Schaik Publishers; 2013.

143. Otasowie J, Castells X, Ehimare UP, Smith CH. Tricyclic antidepressants for attention deficit hyperactivity disorder (ADHD) in children and adolescents.

Cochrane Database Syst Rev. 2014;(9).

144. DiBattista D, Shepherd M-L. Primary school teachers' beliefs and advice to parents concerning sugar consumption and activity in children. Psychol Rep. 1993;72(1):47–55.

145. DuPaul GJ, Weyandt LL. School-based intervention for children with attention deficit hyperactivity disorder: Effects on academic, social, and behavioural functioning. Int J Disabil Dev Educ. 2006;53(2):161–76.

146. Reichenberg LW, Seligman L. Selecting effective treatments: A comprehensive, systematic guide to treating mental disorders. John Wiley & Sons; 2016.

147. Vereb RL, DiPerna JC. Teachers' Knowledge of ADHD, Treatments for ADHD, and Treatment Acceptability: An Initial Investigation. School Psych Rev. 2004;33(3).

148. Efron D, Sciberras E, Hassell P. Are schools meeting the needs of students with ADHD? Australas J Spec Educ. 2008;32(2):187–98.

149. Efron D. The role of schools in the diagnosis of ADHD. The Lancet Psychiatry. 2017;4(11):825–6.

150. Kauffman JM, Lloyd JW, McGee KA. Adaptive and maladaptive behavior: Teachers' attitudes and their technical assistance needs. J Spec Educ. 1989;23(2):185–200.

151. Rizzo TL, Vispoel WP. Physical Educators' Attributes and Attitudes Toward Teaching Students With Handicaps. Adapt Phys Act Q. 1991;8(1).

152. Fiks AG, Ross ME, Mayne SL, Song L, Liu W, Steffes J, et al. Preschool ADHD diagnosis and stimulant use before and after the 2011 AAP Practice Guideline. Pediatrics. 2016;138(6):e20162025.

Appendix A

Teacher Characteristics

Gender

Male

Female

Age

< 30

30– 39

40 – 49

50 – 59

>60

Highest level of education completed

Bachelor's degree

Graduate diploma

Post-graduate degree

Total number of teaching experience (years)

_____years

ADHD experience

ADHD Articles Read

None

1 – 3

4 – 6

7 – 9

10 or more

ADHD Workshops Attended

None

1 – 2

3 – 4

5 or more

How many children with ADHD have you taught?

0

1 – 2

3 – 5

>6

Do you know anyone outside of school who has ADHD?

Yes

No

Do you feel confident to teach a child with ADHD?

Yes

No

Appendix B

KADDS

Please answer the following questions regarding Attention-Deficit/Hyperactivity Disorders (ADHD). If you are unsure of an answer, respond Don't Know (DK)

True (T), False (F), or Don't Know (DK) (circle one):

1.**T F DK** Most estimates suggest that ADHD occurs in approximately 15% of school age children.

2**. T F DK** Current research suggests that ADHD is largely the result of ineffective parenting skills.

3. **T F DK** ADHD children are frequently distracted by extraneous stimuli.

4. **T F DK** ADHD children are typically more compliant with their fathers than with their mothers.

5**. T F DK** In order to be diagnosed with ADHD, the child's symptoms must have been present before age 7.

6. **T F DK** ADHD is more common in the 1st degree biological relatives (i.e. mother, father) of children with ADHD than in the general population.

7. **T F DK** One symptom of ADHD children is that they have been physically cruel to other people.

8. **T F DK** Antidepressant drugs have been effective in reducing symptoms for many ADHD children.

9. **T F DK** ADHD children often fidget or squirm in their seats.

10. **T F DK** Parent and teacher training in managing an ADHD child are generally effective when combined with medication treatment.

11. **T F DK** It is common for ADHD children to have an inflated sense of self-esteem or grandiosity.

12**. T F DK** When treatment of an ADHD child is terminated, it is rare for the child's symptoms to return.

13. **T F DK** It is possible for an adult to be diagnosed with ADHD.

14. **T F DK** ADHD children often have a history of stealing or destroying other people's things.

15. **T F DK** Side effects of stimulant drugs used for treatment of ADHD may include mild insomnia and appetite reduction.

16. **T F DK** Current wisdom about ADHD suggests two clusters of symptoms: One of inattention and another consisting of hyperactivity/impulsivity.

17. **T F DK** Symptoms of depression are found more frequently in ADHD children than in non-ADHD children.

18. **T F DK** Individual psychotherapy is usually sufficient for the treatment of most ADHD children.

19. **T F DK** Most ADHD children "outgrow" their symptoms by the onset of puberty and subsequently function normally in adulthood.

20. **T F DK** In severe cases of ADHD, medication is often used before other behaviour modification techniques are attempted.

21. **T F DK** In order to be diagnosed as ADHD, a child must exhibit relevant symptoms in two or more settings (e.g., home, school).

22. **T F DK** 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.

23. **T F DK** Reducing dietary intake of sugar or food additives is generally effective in reducing the symptoms of ADHD.

24. **T F DK** A diagnosis of ADHD by itself makes a child eligible for placement in special education.

25. **T F DK** Stimulant drugs are the most common type of drug used to treat children with ADHD

26. **T F DK** ADHD children often have difficulties organizing tasks and activities.

27. **T F DK** ADHD children generally experience more problems in novel situations than in familiar situations.

28. **T F DK** There are specific physical features which can be identified by medical doctors (e.g. pediatrician) in making a definitive diagnosis of ADHD.

29. **T F DK** In school age children, the prevalence of ADHD in males and females is equivalent.

30. **T F DK** In very young children (less than 4 years old), the problem behaviors of ADHD children (e.g. hyperactivity, inattention) are distinctly different from age-appropriate behaviors of non-ADHD children.

31. **T F DK** Children with ADHD are more distinguishable from normal children in a classroom setting than in a free play situation.

32. **T F DK** The majority of ADHD children evidence some degree of poor school performance in the elementary school years.

33. **T F DK** Symptoms of ADHD are often seen in non-ADHD children who come from inadequate and chaotic home environments.

34. **T F DK** Behavioral/Psychological interventions for children with ADHD focus primarily on the child's problems with inattention.

35. **T F DK** Electroconvulsive Therapy (i.e. shock treatment) has been found to be an effective treatment for severe cases of ADHD.

36. **T F DK** Treatments for ADHD which focus primarily on punishment have been found to be the most effective in reducing the symptoms of ADHD.

37. **T F DK** Research has shown that prolonged use of stimulant medications leads to increased addiction (i.e., drug, alcohol) in adulthood.

38. **T F DK** If a child responds to stimulant medications (e.g., Ritalin), then they probably have ADHD.

39. **T F DK** Children with ADHD generally display an inflexible adherence to specific routines or rituals.

Appendix C

Wed, May 16, 2018 at 7:29 PM, Mark Sciutto <marksciutto@muhlenberg.edu> wrote:

Dear Tamara,

I apologize for the delay in getting back to you. Thank you for your interest in the Knowledge of Attention Deficit Disorders Scale (KADDS). I have attached a brief test manual, which contains information on the scale. It is not quite up to date, but it should give you some idea of the properties of the scale. Several recent studies have used the KADDS and we recently finished a cross-cultural study of teacher knowledge in 9 countries. I have attached a copy of that article. If you would like to use the KADDS, I only ask that you forward a copy of the results when available. I also ask that you do not reproduce the scale in its entirety in any published document.

Best regards and good luck with your research!

Mark

Appendix D

INFORMATION SHEET FOR THE PRINCIPAL

Foundation Phase Educators' Perceptions of Attention Deficit Hyperactivity Disorder (ADHD) at Independent Schools in Johannesburg

Dear Principal

I am currently doing my Masters in Childhood Neurodevelopment (MSc Med Child Health) through the University of the Witwatersrand (Wits). I am conducting research as part of the requirement for the completion of the degree.

My research project aims to examine Foundation Phase educators' perceptions of ADHD looking at the incidence, causes and available interventions for those learners exhibiting ADHD type behaviours. This is particularly pertinent as Attention Deficit Hyperactivity Disorder (ADHD) has significantly increased in prevalence amongst school-going children. Literature in this field is scarce, specifically in the South African context, and the outcomes of this study will hopefully contribute to a better understanding of educators' perceptions of ADHD.

The foundation phase educators who choose to take part in this study are required to complete the attached questionnaire. Completion of the questionnaire should take between 10 to 15 minutes. The educators will then be asked to return the completed questionnaires to a sealed box in the staff room. There will be a second part to my study whereby teachers can choose to participate in a focus group which will look at ADHD in more detail, in the hope of providing a better understanding of ADHD.

Participation in the study is entirely voluntary. No-one will be disadvantaged if they decline to participate. Due to the nature of the study there are no inherent dangers or risks to either the staff or learners at your school. Participants may choose to withdraw from the study at any stage, and they may choose to leave out specific

questions. Anonymity will be ensured as no identifying information is requested. The results will be processed by myself, the researcher, and my supervisor, so confidentiality is ensured.

General feedback from the results of the study will be presented in a summary which will be sent to your school on completion of the research. A copy of the final report will be sent to each principal. Results may also be reported in journal articles.

I am ethically obligated to, and hereby do, formally request permission to conduct this research at your school.

Kind Regards

_____

Dr Tamara Jaye

I _____ consent to this study on Foundation Phase teachers' knowledge and perceptions of ADHD conducted by Tamara Jaye

Signed _____

Date_____

Appendix E

INFORMATION SHEET FOR THE PARTICIPANT

Foundation Phase Educators' Perceptions of Attention Deficit Hyperactivity Disorder (ADHD) at Independent Schools in Johannesburg

Dear Participant

I am currently doing my Masters in Childhood Neurodevelopment (MSc Med Child Health) through the University of the Witwatersrand (Wits). I am conducting research as part of the requirement for the completion of the degree.

My research project aims to examine Foundation Phase educators' perceptions of ADHD looking at the incidence, causes and available interventions for those learners exhibiting ADHD type behaviours. This is particularly pertinent as Attention Deficit Hyperactivity Disorder (ADHD) has significantly increased in prevalence amongst school-going children. Literature in this field is scarce, specifically in the South African context, and the outcomes of this study will hopefully contribute to a better understanding of educators' perceptions of ADHD.

For participation in the study, there is a standardised questionnaire attached which should be filled out. The questionnaire should take no longer than15 minutes. Once complete, questionnaires should be returned to the sealed box in the staff room.

For those wishing to participate, there will be a focus group scheduled at a later stage, whereby a more in-depth discussion will take place regarding ADHD.

Participation in the study is entirely voluntary. No-one will be disadvantaged if they decline to participate. Due to the nature of the study there are no inherent dangers or risks to either the staff or learners at your school. Participants may choose to withdraw from the study at any stage, and they may choose to leave out specific questions. Anonymity will be ensured as no identifying information is requested. The

results will be processed by myself, the researcher, and my supervisor, so confidentiality is ensured.

General feedback from the results of the study will be presented in a summary which will be sent to your school on completion of the research. A copy of the final report will be sent to each principal. Results may also be reported in journal articles.

I am ethically obligated to, and hereby do, formally request permission to conduct this research at your school.

Kind Regards

_____

Dr Tamara Jaye

Appendix F

Questions for the discussion group about ADHD

1. What is a teachers' role when it comes to ADHD medication?

2. What are teachers' expectations of the medication?

3. What are the side effects of using ADHD medication?

4. What aspects in a child's environment impact on his ADHD behaviour?

5. How do teachers manage these pupils with ADHD within a classroom setting?

6. What are your views with regards to the teacher's role within the multidisciplinary team when working with ADHD pupils?

Appendix G

INFORMATION SHEET FOR THE PARTICIPANT

Foundation Phase Educators' Perceptions of Attention Deficit Hyperactivity Disorder (ADHD) at Independent Schools in Johannesburg

Dear Participant

I am currently doing my Masters in Childhood Neurodevelopment (MSc Med Child Health) through the University of the Witwatersrand (Wits). I am conducting research as part of the requirement for the completion of the degree.

My research project aims to examine Foundation Phase educators' perceptions of ADHD looking at the incidence, causes and available interventions for those learners exhibiting ADHD type behaviours. This is particularly pertinent as Attention Deficit Hyperactivity Disorder (ADHD) has significantly increased in prevalence amongst school-going children. Literature in this field is scarce, specifically in the South African context, and the outcomes of this study will hopefully contribute to a better understanding of educators' perceptions of ADHD.

As part of this study, we are hoping to run a focus group with 6 – 10 individuals. A moderator will ask several questions while facilitating the discussion. The focus group will be audio-recorded and a note-taker will be present. We estimate this group discussion will take an hour.

Participation in the study is entirely voluntary. No-one will be disadvantaged if they decline to participate. Due to the nature of the study there are no inherent dangers or risks to either the staff or learners at your school. Participants may choose to withdraw from the study at any stage, and they may choose to leave out specific questions. Anonymity will be ensured as no identifying information is requested. The results will be processed by myself, the researcher, and my supervisor, so confidentiality is ensured.

General feedback from the results of the study will be presented in a summary which will be sent to your school on completion of the research. A copy of the final report will be sent to each principal. Results may also be reported in journal articles.

I am ethically obligated to, and hereby do, formally request your permission to conduct this research project at your school.

Kind Regards

_____

Dr Tamara Jaye

Appendix H

Consent form for audio recording

This study involves audio recording. Please tick the appropriate box

- I am aware that the focus group in which I am participating may be audio recorded. I agree to this. I also understand that if I am uncomfortable during the focus group at any time, I may request that the recording equipment be switched off. I also understand that I can request a copy of the audio recording of the group. ☐

- I do not agree to being audio recorded for this research. ☐

After considering the above statements, I consent to participate in the focus group.

Name: (please print): _____

Signature: _____ Date: _____

Investigator's Signature _____ Date: _____

Appendix I

Informal discussion group

Date: 25 February

Venue: Staff room at school X

Participants: 32 Foundation Phase teachers

Duration: 1 hour

Interviewers: Dr Tamara Jaye, Dr Sheri Hanson

Recording of interview: notes were taken and the focus group was audio-recorded

What is your role as a teacher when it comes to ADHD medication?

We have a medicine policy. There is a specific form that needs to be filled in prior to medication being dispensed, parents need to request in writing that teachers are permitted to dispense medication to their children. Top-up medication is sometime given during the day, however it is more common that the pupils are on long-acting medication that is given at home before the start of school. With older children, they administer the medication themselves, however in the Foundation Phase the teachers need to be involved. Every day teachers need to sign that they've given the top-up medication and sign it in the homework book.

How would you suggest to parents that their child possibly has an ADHD diagnosis?

We are not allowed to say that a child requires Ritalin or has ADHD. We would describe the symptoms that we are seeing in class, we would say that we find this behaviour concerning. This is essentially the protocol that we follow. We would suggest an assessment at a psychiatrist or neurologist.

What are your expectations of the medication?

The medication helps the child that they become more attentive, they follow instructions better. It often improves hand-writing and reduces the need for the child to attend Occupational Therapy. Their self-esteem often improves with the medication, their processing is better.

Have you had any disappointments with medication?

Yes. It often takes time to work, it sometimes works for one child but not another. We will need to tell the parents that we see little difference. We are often asked to fill out a progress report or do a Connors once medication has been given for a certain time. If the medication doesn't work the child often goes back to the doctor, something else is tried, the medicine may be changed to a different medication. Some parents opt for alternative medication like homeopathic remedies. These have never made any

difference to behaviour. The long-acting tablet won't work if the capsule is opened and the medication administered that way. It will lose its long-acting properties and only work for 4 hours.

Do colourants and sugar affect behaviour?

Yes definitely! Our school tuckshop has limited sweets. With the younger kids we try implement that sweets are rather eaten at second break. We had a child on the same medication for Grade 1 and Grade 2. The behaviour was far worse in Grade 2. The family worked with the doctor and made the connection that the child was taking his Ritalin with hot chocolate in Grade 2, no longer as he had done in Grade 1. This seemed to affect the efficacy of the medication.

Do you have communication with the child's doctor?

Initially we fill out the Connors, we have regular feedback with the parents, often psychiatrists want letters from us about the child's behaviour. We don't often speak directly to the psychiatrist or neurologist. Sometimes parents try to trick us or play games. They'll stop the medication or change the medication and ask us several days later if we noticed any difference in the child's behaviour.

What techniques do you find helpful in managing these children in the classroom?

Move the child closer to the front, move him away from his friends and distractions, send him on an errand, let him go to the toilet during breaks although often these children realise they need a break so they'll ask to go. Also some children need to stand so they can go to the back of the class and stand there. Test situations are often difficult as they don't always perform as well as they should. We've had children who we feel need medication but their parents don't want it and in tests they'll leave out part of the paper. This has implications when they're doing assessments and benchmark tests where they do far worse than what they're capable of doing. Often these children require extra time to complete the assessments or sometimes a scribe is very helpful.

How clear are the criteria for ADHD? Do we sometimes confuse other diagnoses?

Anxiety is the new buzzword. Anxiety and ADHD often go hand-in-hand. The child may not finish the work because of his ADHD but this makes him anxious as a result. And anxiety affects them in that they cannot concentrate properly. Often they'll start the concentration medication, they won't work, and then anxiety medication will be initiated which will make a big difference. Globally anxiety levels are high. The expectations on these children is enormous, they are doing far more advanced work than we had as children. What we did in Grade 9 or 10 they are doing in Grade 7. A vicious cycle exists in which the expectations on the child and teacher grow and as a result this makes the teachers and children more anxious to perform. This continuous pressure impacts on everything. Children are no longer allowed to share a story, they're told to sit down and do their work.

What is a teacher's role in the multidisciplinary team?

Often these children are in multiple therapies such as Occupational Therapy, Physiotherapy and Speech Therapy. As a teacher we need to be in touch with everyone, we need to know what's going on with all the different therapists. Children often do enjoy the therapies and the individual attention but they are anxious about what they've missed in class. After school therapies seem to work better for this aspect.

What is of benefit to teachers when it comes to these pupils with ADHD?

It makes a huge difference when parents are on board and we all work together as a team.

What side effects of medication are you seeing?

We often see a reduction in appetite. Children develop facial tics – they lick their lips, make funny faces, they rub their eyes. It makes them less outgoing. Weight gain is often a side effect of the anxiety medication. Some children pull out their hair.

What numbers of children with ADHD are you seeing?

Last year the one teacher had 1 child with ADHD, this year there are 6 out of 20. Several children don't have a formal diagnosis. Some have been assessed and advised to start medication but don't want to go that route and it's difficult to convince them. Often an ADHD diagnosis is a journey. Parents often have heard the same story for a number of years and are at a point where they're not managing the work. Its very undermining for the child. Parents will often say their child can play Lego for hours or sit still in front of the TV. Or they can do a difficult puzzle on their own. They don't see that with a time limit the child will probably battle and it's different to applying knowledge during a class activity. Also it's an area of interest so they're able to concentrate better, and there are limited distractions compared to a busy classroom.

What contributes to the more cases being seen?

There's a large genetic component. We teach an ADHD child, and when we meet the parents its obvious that one of them has ADHD too. Maybe ADHD was not popular in 'those days'. It's more obvious as pressures are higher now. Screen time also plays a role with children watching TV for hours. The class environment is far different to how it was 35 years ago. Also there are far more acrimonious divorces, children are always on their nerves, difficult to know if this is ADHD.

Do parents understand the pharmacology of the medication?

Parents will often Google the side effects. They often have a mental block and will start a discussion by saying that 'my child is never going on meds'. They're scared of

the medication. They often don't have enough information and they decide before they fully understand the medication. They'll say their child is immature so the behaviour will come right with maturity. We have a basis of comparison with the other children in the class so we're able to see which children may benefit from medication. If the whole class is unable to sit still then we realise that our program may be pitched at the wrong level and needs to be adjusted. They often mention they're concerned that the medication may make their child turn into a drug addict. However, the opposite is true.

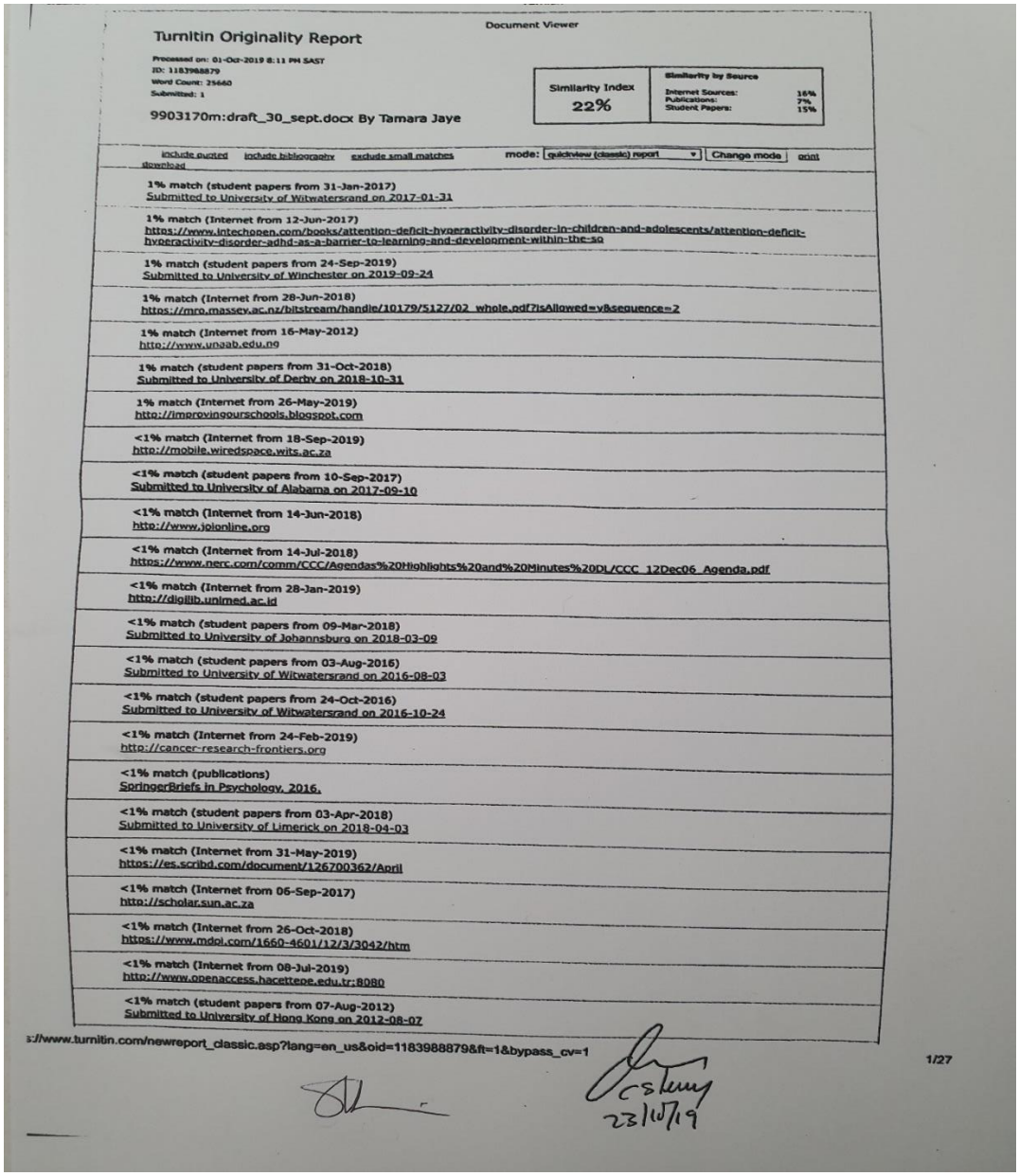
Any further comments?

As children get older ADHD management gets easier. The younger they're started on medication the dose plateaus and maturity takes over resulting in no longer needing to increase the dosage. They learn to control themselves. They're able to take their own medication without telling anyone. Foundation Phase is a very difficult stage. By high school many have stopped their medication and are doing nicely, however many do need it long term ie Grade 1 until matric. Also, we are seeing many more children that are 'different', possibly on the autism spectrum. Not everyone can be medicated.

Several questions were posed such as if we are medicating more in South Africa than overseas, do private schools medicate more than public schools? Are private school parents more hysterical about the side effects than other parents? Also in public schools the emphasis is different – here we go on training courses, have facilities as opposed to public school teachers just trying to survive.

The pressure is far greater than it used to be. Children are so scared of making mistakes and constantly strive for perfection. We need to be driving a culture where its ok to make mistakes and try again. Perhaps the expectation for children needs to change. They don't need to be academic, other options are available, even more so than before. Diplomas aren't encouraged, no-one goes into teaching they rather opt for therapies for example. There should be streams that offer plumbing and hairdressing for example instead of certain children struggling to obtain a degree. Comments when a child gets 60% for a benchmark test is 'is that the best he can do'? 60% is actually ok. A doctor mother just can't understand why her child is just average.

Appedix J



Document Viewer

Turnitin Originality Report

Processed on: 01-Oct-2019 8:11 PM SAST
ID: 1183988879
Word Count: 25660
Submitted: 1

9903170m:draft_30_sept.docx By Tamara Jaye

Similarity Index	Similarity by Source	
22%	Internet Sources:	16%
	Publications:	7%
	Student Papers:	15%

include quoted include bibliography exclude small matches mode: quickview (classic) report Change mode print download

1% match (student papers from 31-Jan-2017)
Submitted to University of Witwatersrand on 2017-01-31

1% match (Internet from 12-Jun-2017)
https://www.intechopen.com/books/attention-deficit-hyperactivity-disorder-in-children-and-adolescents/attention-deficit-hyperactivity-disorder-adhd-as-a-barrier-to-learning-and-development-within-the-so

1% match (student papers from 24-Sep-2019)
Submitted to University of Winchester on 2019-09-24

1% match (Internet from 28-Jun-2018)
https://mro.massey.ac.nz/bitstream/handle/10179/5127/02_whole.pdf?isAllowed=y&sequence=2

1% match (Internet from 16-May-2012)
http://www.unaab.edu.ng

1% match (student papers from 31-Oct-2018)
Submitted to University of Derby on 2018-10-31

1% match (Internet from 26-May-2019)
http://improvingourschools.blogspot.com

<1% match (Internet from 18-Sep-2019)
http://mobile.wiredspace.wits.ac.za

<1% match (student papers from 10-Sep-2017)
Submitted to University of Alabama on 2017-09-10

<1% match (Internet from 14-Jun-2018)
http://www.jolonline.org

<1% match (Internet from 14-Jul-2018)
https://www.nerc.com/comm/CCC/Agendas%20Highlights%20and%20Minutes%20DL/CCC_12Dec06_Agenda.pdf

<1% match (Internet from 28-Jan-2019)
http://digilib.unimed.ac.id

<1% match (student papers from 09-Mar-2018)
Submitted to University of Johannsburg on 2018-03-09

<1% match (student papers from 03-Aug-2016)
Submitted to University of Witwatersrand on 2016-08-03

<1% match (student papers from 24-Oct-2016)
Submitted to University of Witwatersrand on 2016-10-24

<1% match (Internet from 24-Feb-2019)
http://cancer-research-frontiers.org

<1% match (publications)
SpringerBriefs in Psychology, 2016.

<1% match (student papers from 03-Apr-2018)
Submitted to University of Limerick on 2018-04-03

<1% match (Internet from 31-May-2019)
https://es.scribd.com/document/126700362/April

<1% match (Internet from 06-Sep-2017)
http://scholar.sun.ac.za

<1% match (Internet from 26-Oct-2018)
https://www.mdpi.com/1660-4601/12/3/3042/htm

<1% match (Internet from 08-Jul-2019)
http://www.openaccess.hacettepe.edu.tr:8080

<1% match (student papers from 07-Aug-2012)
Submitted to University of Hong Kong on 2012-08-07

s://www.turnitin.com/newreport_classic.asp?lang=en_us&oid=1183988879&ft=1&bypass_cv=1 1/27

23/10/19

Appendix K

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

R14/49 Dr Tamara Jaye

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M180967

NAME: (Principal Investigator)	Dr Tamara Jaye
DEPARTMENT:	Paediatrics
PROJECT TITLE:	Perceptions and understanding of attention deficit hyperactivity disorder amongst foundation phase teachers at Independent Schools in Johannesburg
DATE CONSIDERED:	28/09/2018
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Dr Sheri Hanson
APPROVED BY:	Dr CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	16/01/2019

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary on the Third Floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, Parktown, 2193, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. I agree to submit a yearly progress report. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in September and will therefore be due in the month of September each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES