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The demographic profile and referral of preschoolers with attention deficit/hyperactivity disorder (ADHD) attending a child, adolescent and family psychiatric unit

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THE DEMOGRAPHIC PROFILE AND REFERRAL OF PRESCHOOLERS WITH ATTENTION DEFICIT/HYPERACTIVITY DISORDER (ADHD) ATTENDING A CHILD, ADOLESCENT AND FAMILY PSYCHIATRIC UNIT

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A research report submitted to the Faculty of Health Sciences, University of Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Medicine in the branch of Psychiatry in February 2021

DECLARATION

I, Dr Annette Antwi-Anyimadu, declare that this research report is my own work. It is being submitted in partial fulfilment of the requirements for the degree of Master of Medicine in Psychiatry at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other university.

Signature: …………

Date: ……23 February 2021……

DEDICATION

This work is dedicated firstly to the Almighty God, without whom nothing is possible.

To my loving husband, Kwabena Afari-Twumasi, this has been a difficult journey, but thank you for remaining fiercely by my side and for your understanding and unconditional support. To my babies, Amanda and Michael, you have had an absent mother for the most part of your lives so far. Thank you for your unconditional love. It is the strength I draw from you that keeps me going. Without you, I would never have had the motivation to complete this work.

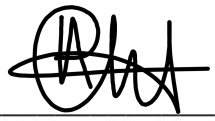
To my father and number one supporter, Kofi Antwi-Anyimadu, my sincere thanks for always being proud of me and believing that I can do anything I put my mind to. To my mother Theresa and my siblings, Ernest, Florence and Emmanuel: thank you for the example you continue to set for me, and for your constant love, support and encouragement through everything that I do.

To my colleagues and dear friends, Dr Phil Pitjeng, Dr Ladawa Goga and Dr Sarah Mashishi: thank you for your consistent support and encouraging pep talks that this can be done.

PLAGIARISM DECLARATION FOR WRITTEN WORK

I, Dr Annette Antwi-Anyimadu, as a postgraduate student registered for Masters of Medicine at the University of the Witwatersrand declare the following:

- I am aware that plagiarism is the use of someone else's work without their permission and/or without acknowledging the original source.
- I am aware that plagiarism is wrong.
- I confirm that this written work is my own work except where I have stated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own work, or if I have failed to acknowledge the ideas or writing of others.

Signature 

February 2021



PRESENTATIONS ARISING FROM THIS STUDY

This work has never been presented at a congress or any academic programme.

PUBLICATIONS ARISING FROM THIS STUDY

This work has never been published.

ABSTRACT

Introduction:

Attention deficit/hyperactivity disorder (ADHD) is one of the most frequently investigated childhood psychiatric illnesses, but data on the condition in Africa is generally lacking, particularly in the under-six age group. The aim of this study was to investigate the socio-demographic profile and referral patterns for preschool children attending a psychiatric clinic in Soweto, Johannesburg.

Methods:

A retrospective descriptive review was conducted to analyse data abstracted from files of under six-year-old children with a diagnosis of ADHD who attended Chris Hani Baragwanath Academic Hospital's (CHBAH) Child, Adolescent and Family Unit's (CAFU) 'Under-six ADHD Clinic' from 1 January 2017 to 31 December 2017. Abstracted data included information on socio-demographics, referral sources and reasons for referral.

Results:

A total of 152 files meeting the inclusion criteria for the study were reviewed. There were significantly more males (n=117, 77%) than females. The majority (n=116, 76%) attended preschool, and more than half (n=78, 51%) hailed from dual parent homes. For most preschoolers with ADHD, household income was derived from a single source (n=65, 43%). Health professionals referred 53% (n=81) of the participants. The main reasons for referral were hyperactivity (n=65, 43%), followed by behavioural problems (n=22, 14%), and developmental delay (n=15, 10%). Allied health professionals referred a significantly greater number of preschoolers with developmental delay (n=9), compared to health professionals who referred mainly for hyperactivity (n=44).

Conclusion:

Most of the findings of this study correlated with other studies conducted worldwide. Screening for ADHD at the preschool age is imperative, as early intervention is likely to interrupt the trajectory of the illness, which ultimately results in a high cost to the

economy. Interventions such as the specific support programme for Grade R teachers on ADHD recently developed in South Africa (SA) for this very indication should be further explored and expanded to different appropriate settings in creating awareness of ADHD.

ACKNOWLEDGEMENTS

My sincere gratitude to my supervisor, Dr Wendy Friedlander, for your invaluable input and contribution to this work. I continue to learn so much from you. Without you, none of this would have been possible, and I appreciate your tireless efforts in ensuring that this work is of good quality and meets the acceptable standards.

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LIST OF ABBREVIATIONS

ADHD	Attention deficit hyperactivity disorder
ASD	Autism spectrum disorder
BRIEF-P	Behaviour Rating Inventory of Executive Function-Preschool version
CAFU	Child, Adolescent and Family Unit
CEO	Chief Executive Officer
CHBAH	Chris Hani Baragwanath Academic Hospital
DSM-V	Diagnostic and Statistical Manual of Mental Disorders 5th edition
DSM IV-TR	Diagnostic and Statistical Manual of Mental Disorders 4th edition Text Revision
ESRC	Economic and Social Research Council
HREC	Human Research Ethics Committee
K-CPT	Conners' Kiddie Continuous Performance Test
MPH	Methylphenidate
NFPP	New Forest Parenting Programme
NGO	Non-governmental organisation
ODD	Oppositional defiant disorder
PCIT	Parent-child Interaction Therapy
RAD	Reactive attachment disorder
SA	South Africa
SES	Socio-economic status
Stats SA	Statistics South Africa
US	United States of America

CHAPTER ONE: INTRODUCTION

1.1 Background

Attention deficit/hyperactivity disorder (ADHD) is a childhood onset neurodevelopmental disorder characterised by an impairing and developmentally inappropriate combination of core symptoms of inattention, hyperactivity and impulsivity. It is the most common psychiatric disorder in children. ADHD is deemed to result from multiple complex neurobiological and environmental factors (Thapar and Cooper, 2016, Gupte-Singh et al., 2017) and associated with dysregulation of neurotransmitters in the frontal lobes (Tandon and Pergjika, 2017).

In South Africa (SA), there is limited information on prevalence rates, access to care and treatment for ADHD. A 2017 SA study found a 2.7% prevalence rate in over 500 children aged between five and 14 years screened in 13 schools (Schoeman et al., 2018). Data on the prevalence rates of the condition amongst SA preschoolers is lacking. Another study done in the country has highlighted the substantial deficiencies in the health system for provisions of psychiatric services for preschool children aged ≤6 years old (Lumu et al., 2016). It demonstrated that at 52.8%, ADHD is the leading psychiatric diagnosis in this age-group who has accessed health care. This further demonstrates the impact that lack of availability of appropriate health services is likely to have on this patient population in the long term, as is known to be the case especially in the underprivileged communities in South Africa (Schoeman et al., 2018).

Chris Hani Baragwanath Academic Hospital (CHBAH) is a level 3 facility in Soweto, Johannesburg, South Africa. The hospital serves a vast population of South Africa's Gauteng Province. It receives patients from both rural and urban areas. The 'Under-six ADHD Clinic' is an initiative spearheaded by a child psychiatrist and the current head of the department of CHBAH's Child/Adolescent and Family Unit (CAFU). The referral system is such that potential patients for the service require a referral letter and are then booked for a screening date. If deemed appropriate during this process, the child is then given an appointment with the child psychiatrist for evaluation. As it is a one-of-a-kind

clinic, referrals are not limited only to secondary-level facilities, as is procedure for the rest of the hospital, but may also come from primary facilities. Walk-ins are, however advised rather to present to a primary-level facility to be screened. CHBAH Under-six Clinic is the only clinic known of its kind in South Africa, and therefore serves a much broader drainage area than the rest of the department. This puts it in the best position to investigate factors associated with ADHD in the under-six population.

CHAPTER TWO: LITERATURE REVIEW

2.1 Epidemiology

2.1.1 Prevalence

The prevalence of ADHD has been noted to be increasing over the past two decades and different schools of thought exist to explain this. Some suggest that the actual prevalence has increased, with numerous new environmental factors (such as electronic media) which may pose as risk factors in children (Thapar and Cooper, 2016); others suggest that the actual prevalence remains unchanged, but that more general awareness has been created about the condition and is therefore diagnosed more frequently (Kiely and Adesman, 2015). There are conflicting reports regarding worldwide prevalence of ADHD in childhood, with some sources reporting ranges between 1.4% to 3% (Thapar and Cooper, 2016); and others suggesting as high as 5% to 10% (Tarver et al., 2014, Zeegers et al., 2010). Unlike in Europe and North America, research on ADHD across the African continent is sparse, likely because the condition is known to be under-recognised and under-treated in low socio-economic settings (Bakare, 2012, Vrba et al., 2016). One review article suggested that ADHD prevalence ranges between 5.4% to 8.7% amongst school-going African children, but only 1.5% amongst non-schooling children from the general population (Bakare, 2012).

In SA, data sources have suggested estimates from 2% to 8% (van Dyk et al., 2015) and about 5% to10%, (Bakare, 2012, de Milander et al., 2020) over the recent years. A recent small South African study (de Milander et al., 2020) conducted in the Free state suggests that the prevalence of ADHD may be higher than previously known, with findings of as high as 25.4% of the school-going children noted with symptoms of ADHD, with 7.7% with the combined subtype, 6.7% hyperactivity and impulsiveness, and 11.0% with inattentiveness.

ADHD has become the most common psychopathology in preschoolers and the mean age of onset of symptoms for this age group is between age 3 and 4. (Armstrong and Nettleton, 2004). The prevalence of ADHD among the subset of preschoolers is suggested to be as common as in school-aged children (Tandon and Pergjika, 2017)

whereas previous epidemiologic surveys quoted slightly lower (Greenhill et al., 2008). Preschoolers in this context, refers to children up to and younger than six years old.

In SA, the lifetime prevalence of ADHD is unknown (Schoeman and Liebenberg, 2017). Data available in the adult population estimates the population prevalence to be 1.09%, and as high as 52.5% in the psychiatric clinical setting (Schoeman and Liebenberg, 2017). The scarcity of available data makes it difficult to make realistic generalisations on this subject.

2.1.2 Aetiology

The aetiology of ADHD is multifaceted — a complex interplay of genetic and environmental factors, and is a field being extensively studied. Genetic risk is significant (Tarver et al., 2014). A parent with ADHD has a 50% chance of bearing a child with the condition. First degree relatives of ADHD sufferers are two to eight times more likely to have the condition compared to those with no affected relatives. Heritability of 71% to 90% has been noted in twin studies, specifically for the combined and inattentive types (Tandon and Pergjika, 2017). Research has focused on genes involved in dopaminergic transmission, displaying moderate associations between ADHD and various dopamine receptors, as well as dopamine and serotonin transporters (Tandon and Pergjika, 2017, Tarver et al., 2014, Li et al., 2010). Environmental factors are also noted to have a profound influence to disease risk if experienced in early life (Noordermeer et al., 2017, Li et al., 2010).

2.1.3 Risk Factors

Risk factors are numerous and have several categories. These include pre- and perinatal risk factors such as maternal age, maternal smoking, alcohol use and adverse events or severe psychological distress in pregnancy (Tarver et al., 2014, Li et al., 2010, Halmoy et al., 2012, Serati et al., 2017). These may increase the risk of ADHD by up to four times. Complications in pregnancy such as antepartum haemorrhage, eclampsia, prolonged delivery, preterm birth, increased maternal age, maternal physical illness (Serati et al., 2017) , low and very low (< 1.5kg) birth weight are also described and known to increase risk of the disorder. Postnatal factors such as short duration of breastfeeding (Nur Say et

al., 2016), poor parental socio-economic status and adverse life events (Halmoy et al., 2012, Serati et al., 2017), and severe deprivation and neglect (Tarver et al., 2014) are also notable risk factors in the development of childhood ADHD. One study suggests that electronic media, such as cartoons and video games may also contribute to the development of the condition in childhood (Kiely and Adesman, 2015). Environmental protection agencies have highlighted ADHD as one of the two ‘‘emerging issues’’ in children’s environmental health, with increasing concerns about the relationship between neurotoxic agents in the environment and ADHD (Armstrong and Nettleton, 2004). Several African studies have also found a link between organic brain pathology and ADHD, speculating that ADHD may result as a long-term complication of illnesses such as tuberculous meningitis (Bakare, 2012).

Other risk factors associated with ADHD are listed below:

2.1.3.a Gender

ADHD is known to be more common in boys than in girls, with estimates ranging from between 2:1 to 9:1 in children of school going age (Thapar and Cooper, 2016, Regnart et al., 2014, Rucklidge, 2010), with some studies suggesting even as high as 12:1 (Regnart et al., 2014). This can be explained by diagnostic bias, as males more frequently display externalising symptoms such as hyperactivity and impulsivity, whereas females exhibit less noticeable symptoms (internalising symptoms) such as forgetfulness and disorganisation (Lumu et al., 2016, Kiely and Adesman, 2015, Coles et al., 2012); although both may display academic or behavioural difficulties (Kiely and Adesman, 2015). Although it is not surprising that elevated externalising symptoms are associated with stability in ADHD diagnosis, children with internalising symptoms have been found to have a higher risk of ADHD persistence (Law et al., 2014), and therefore better screening of these symptoms has crucial implications.

Generally, referred sample proportions tend to be higher (6:1–9:1) than community-based samples (2:1–3:1) (Regnart et al., 2014, Thapar and Cooper, 2016, Coles et al., 2012), as teachers and clinics tend to refer more males (Rucklidge, 2010, Coles et al., 2012). This is presumed to be as a result of the gender differences in the expression of ADHD.

It is therefore skewed on the basis of referral bias rather than any biological mechanism (Abd El Naby and Naguib, 2018). In studies of preschool-aged children, the male: female ratio is at an estimated 5:1 (Tandon and Pergjika, 2017).

It has also been suggested that parents of boys with ADHD display better help seeking behaviour than that of girls, and that overall, boys are about five times more likely to receive an evaluation, diagnosis or treatment compared to their female counterparts (Corkum et al., 2015, Maniadaki et al., 2006). Diagnosis of ADHD is typically made in middle childhood (prior to age 12); however, symptoms are commonly present in preschool years (Tarver et al., 2014, Chinawa et al., 2014).

2.1.3. b Schooling

It has previously been noted that there is a discrepancy in the diagnosis of ADHD in school attending (5.4 – 8.7%) and non-school attending (1.5%) African children (Bakare, 2012). This is suggested to be due to the possibility that ADHD symptoms are more noticeable in a more structured school environment as compared to a home or community environment where high levels of concentration may not be required in normal routine tasks. On the other hand, a South African study (Schoeman, 2018) has demonstrated that teachers have low levels of awareness of ADHD and very stereotypical views of its clinical presentation, and due to the deficiencies within the education system, some teachers may have inadequate training to identify ADHD as a possible cause of learning difficulties in a child (de Jongh et al., 2019). According to Statistics South Africa (Stats SA), the prevalence of preschoolers between ages zero and six enrolled in some form of formalised education ranges between 15.2% and 87% (StatsSA, 2019). This leaves a large proportion of children who may meet the criteria for ADHD but are not yet identified.

2.1.3.c Primary Caregiver

It is suggested that children from single-parent households are at a risk of developing psychopathology (Lumu et al., 2016). Furthermore, a systematic review suggests that children from single-parent households may find it more difficult to access health care for their ADHD diagnosis than that of their counterparts (Corkum et al., 2015). A South African study suggests that non maternal child care, parental psychiatric disorder,

among others, were significant risk factors for the development of ADHD (van Dyk et al., 2015).

2.1.3.d Household income

An American study (Reyes et al., 2013) found that rates of ADHD were increased with lower median household income, but a Nigerian study, amongst others, have been unable to find a significant association between socio-economic class and ADHD, therefore such findings need to be interpreted with caution (Chinawa et al., 2014).

2.2 Screening, Diagnosis and Treatment

2.2.1 Screening

Screening is recommended as early as possible to avoid the sequelae of ADHD, with some suggestions as early as four years of age (Thomaidis et al., 2017). Screening programmes should be implemented for those deemed high risk of developing ADHD, as well as the cognitive and affective sequelae thereof, so the appropriate intervention options may be explored timeously. For programmes to be effective in identifying ADHD, they should be comprehensive enough to detect externalising and internalising features of the condition. Numerous studies, including that from Turkey and Spain have found evidence to support the use of combining rating scales such as the Behaviour Rating Inventory of Executive Function-Preschool version (BRIEF-P) and The Conners' Kiddie Continuous Performance Test (K-CPT) in identifying preschoolers with behavioural difficulties and ADHD who scored poorly in numerous cognitive domains such as executive functioning, working memory and attention (Tuna Cak et al., 2017, Ezpeleta and Granero, 2015). A Chinese study, (Zhang et al., 2018) found the BRIEF-P a useful tool in determining neuropsychological dysfunction in preschoolers with ADHD.

A small Iranian study found that BRIEF-P could be used as a valid tool to assess behavioural aspects of executive functions, particularly in differentiating school-going children with ADHD with those without (Zarrabi et al., 2015).

2.2.2 Diagnosis and clinical features

ADHD has now been classified as a neurodevelopmental disorder, meaning it is usually evident early in a child's development and leads to academic, social, occupational and personal impairment. Other neurodevelopmental disorders include autism spectrum disorders (ASD), specific learning disability and motor disorders, for example tics, to name a few (Vogel, 2014).

In the preschool age, speculative analyses have been postulated regarding a specific relationship between ADHD and the language learning process. As language learning is an ongoing transactional process between a child and parent that are mutually supporting, a disruption in this, due to the lack of attention, as well as parental response to the child's hyperactive or impulsive or other problematic behaviours may result in a shift to more directive and less supportive linguistic style, which may ultimately result in overall delay in the acquisition of language (Armstrong and Nettleton, 2004).

The American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* 5th edition (DSM-5) requires six symptoms in the domain of inattention, or six in the hyperactivity and impulsivity domains; presenting prior to the age of 12 and being pervasive across multiple settings (American Psychiatric Association, 2013) to make the diagnosis of ADHD (see appendix 1).

The predominant symptoms of ADHD per age group is provided in Table 1.

Table 1. Predominant symptoms of ADHD and the pre- and primary school ages, adolescence and adulthood (Vogel, 2014).

Table 1. The predominant symptoms of ADHD and age

	Preschool year	Primary school years	Adolescence	Adulthood
Inattention	Short play Incomplete activities Not listening	Brief activities Changes activities Forgetful Disorganised Distracted	Less persistence Lack of focus on details Poor planning	Incomplete details Forgetful Lack of foresight Distracted Disorganised
Overactivity	Like a whirlwind	Restless Hyperactive	Fidgety	Subjective feelings of restlessness
Impulsivity	Does not listen No sense of danger	Acts out of turn Interrupts Intrusive Thoughtless	Poor self-control Reckless risk taking	Accidents Impatience Premature decision making

The core symptoms that characterise preschool children with ADHD are similar to that of school-age children with ADHD. These symptoms include higher levels of motor activity, low frustration tolerance, impulsivity, inability to sustain attention, distractibility, and poorly organised behaviour. However, differences exist in that hyperactive/impulsive type predominates over the combined type in preschool children as compared to school-going children (Armstrong and Nettleton, 2004).

In the early stage of development, that is, at the preschool age, levels of inattention and particularly hyperactivity/impulsivity are frequently high, but considerable variability in children's trajectories is seen. Among preschool children with elevated levels of inattention and hyperactivity/impulsivity, many, but not all, go on to develop ADHD during the school-age years (O'Neill et al., 2017).

Although symptoms must be present before age 12, the notion of ADHD being a disorder of childhood prevailed only until the 1990s. It is no longer perceived in this way as lifelong prevalence is now widely acknowledged. Age-related symptom decline is expected (Tandon and Pergjika, 2017, Tarver et al., 2014, Mick et al., 2004), and ADHD in the preschool age may persist, partially improve, or remit into school-going ages Research suggests both stability and variability of inattentive and hyperactive/impulsive behaviours in preschoolers over time. However, relatively few studies have followed preschool

children over development to elucidate continuities and discontinuities in ADHD symptomatology and associated functional impairment (O'Neill et al., 2017). Mick et al. 2004, suggest that symptoms of hyperactivity and impulsivity decline substantially by age 11, but inattentive symptoms, though known to improve, remain prominent even up to age 20. This, however has been widely debated in recent years (Gupte-Singh et al., 2017, Mick et al., 2004, Rohde, 2010). An estimated 60% to 70% of patients' overall symptoms persist into adulthood, with estimates of adult prevalence ranging between 2.5% to 4.3% (Schoeman and Liebenberg, 2017).

Like all other complex medical and psychiatric conditions, ADHD is heterogenous at all levels, including clinical, aetiological and pathophysiological. Patients with the condition differ from one another with regards to core symptom combinations, comorbidities, level of impairment, and individual family and social factors (Thapar and Cooper, 2016).

The difficulty in diagnosing ADHD in preschool age arises from the fact that many of the symptoms are similar to developmentally appropriate behaviour in young children; hence, diagnosis relies on the extent to which the symptoms are more pronounced or prevalent than noted in other children of similar age ranges (Mick et al., 2004). The importance in diagnosing ADHD early as it arises in the preschool population, is to avoid the potential adverse effects on the wellbeing and academic achievement of the child in question (Thomaidis et al., 2017). Successful academic achievement in this age-group sets the groundwork for reading and writing through phonological awareness (de Jongh et al., 2019).

Neuropsychological models use three theories to explain the behavioural and cognitive manifestations of ADHD, which is often comorbid with several other psychiatric conditions. Executive functioning is impaired as a result of reduced global brain volume and deficiencies in the fronto-striatal circuitry, which manifest as forgetfulness and difficulties in planning and coordinating daily tasks. Delay aversion is described where children with ADHD are noted to prefer immediate smaller rewards to later larger ones; temporal processing deficits lead to children being unable to accurately gauge the passing of time, making it difficult for them to wait their turn (Tarver et al., 2014). Children with ADHD often display impairments in emotional, social and academic functioning which

may explain several conditions with which ADHD is highly comorbid. These include disruptive behavioural disorders (conduct disorder and oppositional defiant disorders) comprising about 50% of the ADHD children population. Mood disorders (50%) and anxiety disorders (33%) are also highly prevalent in children with ADHD (Tarver et al., 2014, Bakare, 2012). ADHD is also a common comorbidity for children with tic disorders such as Tourette's syndrome (60-70%), as well as adolescents and young adults who misuse substances (25%) (Tarver et al., 2014).

In the preschool population however, oppositional defiant disorders (ODD) and conduct disorder are estimated to be eight times and 26 times more likely in those with ADHD respectively; and depressive symptoms, nine times (Tandon and Pergjika, 2017). Reactive attachment disorder (RAD) is known to be a common comorbid diagnosis with most psychiatric illnesses amongst preschoolers in the South African setting (Lumu et al., 2016).

2.2.3 Treatment

In recent years, more emphasis has been placed on identifying and treating young children with ADHD before they commence school (Charach et al., 2013). Management strategies for preschool children with the diagnosis of ADHD comprises of pharmacological and non-pharmacological interventions. Although pharmacological management is the recommended first line treatment for ADHD resulting in moderate to severe impairment in school-aged and adolescent children, international guidelines do not support medication in the initial management of ADHD in preschool children (Tarver et al., 2014). The American Academy of Child and Adolescent Psychiatry recommend behavioural interventions to be implemented for at least eight weeks before initiating a pharmacologic agent (Tandon and Pergjika, 2017).

Compared to their school-going counterparts, preschoolers have different pharmacokinetic profiles, and unique challenges must be taken into account when considering pharmacotherapy, such as pill-swallowing difficulties, and problems regarding tolerating phlebotomy required to ensure safety of the medication (Childress and Stark, 2018)

Psychosocial behavioural treatments, including parent behaviour training and behaviourally based day-care interventions, are recommended as first-line treatments for ADHD during the preschool years. They are numerous and include New Forest Parenting Programme (NFPP) (Tandon and Pergjika, 2017), which was developed specifically for the management of ADHD in preschool children, aiming to address the self-regulation and attention deficiencies of preschoolers with ADHD (Tandon and Pergjika, 2017).

Pharmacologic options consist of stimulant and non-stimulant interventions. Psychostimulants such as methyphenidate and dexamfetamine, among others, are the recommended pharmacological treatments for ADHD (Thapar and Cooper, 2016); the most widely studied and commonly prescribed of which is methylphenidate (MPH) (Tarver et al., 2014). In SA, MPH is the only licensed stimulant medication for use in ADHD (Regnart et al., 2014).

The flagship study on MPH in preschoolers with Attention-deficit/hyperactivity disorder Treatment Study (PATS) was a multicentre, randomised double-blind efficacy trial designed to evaluate the short-term efficacy in functional outcomes and long-term safety of MPH on preschoolers between three and five years of age who showed poor response to a 10-week psychosocial intervention (March, 2011). It sought to evaluate the effects of MPH (versus placebo) on functional domains, i.e. ADHD symptoms, social skills, emotional status and parental stress during a four week period and its safety by adverse effects over a 40-week time period (Abikoff et al., 2007).

Although it showed that the preschoolers with short-term treatment with MPH improved in some aspects of functioning (Abikoff et al., 2007), it found that the efficacy of MPH for overall functioning in preschoolers is less than that in older children, and that high rates of emotional adverse effects such as nervousness, irritability and crying associated with MPH usage are more common in this age group (Tandon and Pergjika, 2017, Safavi et al., 2016, Abikoff et al., 2007).

In the long term, 30% of participants were reported to have moderate to severe adverse effects, including emotional outbursts, initial insomnia, anorexia, irritable mood, repetitive

behaviours and thoughts (Kollins et al., 2006) and thus safety of the drug for preschoolers was brought into question.

A review of studies from 1980 to 2011 undertaken by Charach et al. 2013, suggests that for preschoolers deemed at risk for ADHD, parent behaviour training is a superior intervention when compared to pharmacological treatment (Charach et al., 2013).

Mood stabilisers and antipsychotics have to a lesser extent been studied for the management of ADHD. Risperidone has been deemed the most safe and effective for disruptive behavioural disorders and ADHD in children. Risperidone has been found to be tolerable and effective in the preschool population, however, it may result in weight gain and hyperprolactinemia (Safavi et al., 2016).

2.3 Referral sources

2.3.1 Family

For ADHD to ultimately be diagnosed, it requires an adult in the child's world to identify problematic symptoms and raise concerns. Parents are their first point of contact, and therefore the best predictors of clinical referral should be parents' perceptions that the child has problems and their (in)ability to cope with them (Maniadaki et al., 2006, Reyes et al., 2013); and the parents' perceptions of the intensity and type of suffering caused to others by the child's condition (Maniadaki et al., 2006). Barriers to parents' health-seeking behaviour include embarrassment, stigma of mental health problems, and concern about being labelled or receiving a diagnosis (Arya et al., 2015). When identified, appropriate primary care recognition of the disorder and referral to specialist care are crucial steps in the pathway.

In SA, however, as is the case in other third world countries (Arya et al., 2015), these steps may be disturbed. Generally, poor identification and treatment of common mental disorders at primary healthcare level is frequent and limited access to specialist resources is the plight of most South Africans accessing health care in the public sector. The service delivery and treatment gap is estimated to be up to 75% (Schoeman, 2018). This important barrier to health care should therefore not be overlooked.

2.3.2 Health professionals and Allied health professionals

In a 2015 SA study, referrals in general for the under-six population for psychiatric evaluation were predominantly by health professionals – nurses and doctors (36.9%), followed by schools (20.8%), allied health professionals (15.4%), parents (12.1%) and social workers (4.7%), (Lumu et al., 2016). Research in the preschool population has noted that parents may delay in help-seeking behaviours as they may deem it part of normal development (Maniadaki et al., 2006). Referral may also be delayed as symptoms may be explained by culturally appropriate phenomena (Corkum et al., 2015), and therefore cultural interventions sought first.

2.3.2 Schools

Teachers play a crucial role in initiating the referral for an ADHD assessment because the structured school environment means that children with problems of inattention, hyperactivity and impulsivity exhibit behaviours with which the other children and their teachers cannot cope (Topkin and Roman, 2015). An Asian study (Arya et al., 2015) which analysed the pathway of care in ADHD children and adolescents found that the majority (45.6%) of patients were referred by school teachers. In SA, teachers' knowledge and attitudes towards ADHD have been analysed in two studies (de Jongh et al., 2019, Topkin and Roman, 2015) which are in agreement that interventions to improve teacher knowledge on the condition is needed.

2.4 Impact of ADHD

2.4.1 Family

ADHD exerts substantial stress on the affected families. The financial burden of ADHD within a household can be substantial, as an American study quoted within a systematic review noted that annual medical costs for children with ADHD may be up to double the cost compared to children without the condition (Corkum et al., 2015). This may explain why families with lower socio-economic status (SES) are less likely to pursue and/or adhere to treatment for ADHD. The health care payment system in SA, however, differs from that of the United States of America (US) and inferences are therefore only

speculative. The same article, which reviewed barriers to evidence-based treatment for ADHD reported on several other studies which corroborated that adherence was significantly related to parents' income, education and job status, and associated these variables with treatment adherence.

There is considerable emotional stress as well: A preschooler with untreated ADHD requires high levels of supervision due to several factors such as excessive motor restlessness and poor intensity of play (Harpin, 2005). This may result in caregiver exasperation and their inability to function optimally, if at all, in their own working environment, where their employers may also lack knowledge of the magnitude of their situation and offer little understanding, thereby making it difficult to find or keep employment. In adulthood, the high levels of unemployment and turnover of jobs associated with ADHD in adults can also have a substantial negative impact on the household.

Studies have shown that preschool children with ADHD tend to present with poor pre-academic skills (Thomaidis et al., 2017), as well as poor intensity of play and excessive motor restlessness (Flood et al., 2016). This predisposes them to a greater risk of numerous school-related and cognitive problems during elementary school years and beyond (Thomaidis et al., 2017). One cross-sectional Greek study suggested an inverse relationship between the presence of ADHD cognitive subdomains such as visual perception, visual motor skills, abstract thinking, language and critical reasoning (Thomaidis et al., 2017). Living with untreated ADHD may set the groundwork for placement in special education and special needs services (Tandon and Pergjika, 2017). Young children with ADHD are also more likely to hurt themselves or others accidentally as a result of their impulsive behaviours (Thomaidis et al., 2017).

2.4.2 Society

If untreated, ADHD impacts on the quality of life of the patients and their families considerably, resulting in disturbances in family relationships and marital functioning (Harpin, 2005), and cumulatively, on society at large. It affects educational attainment, employment status, work performance and interpersonal relationships outside the

household. All of these ultimately impact on societal costs, including healthcare costs (Schoeman and Liebenberg, 2017).

2.5 Justification

Although research into ADHD has increased over the past few years, data in SA is lacking, especially in the under-six population. Early diagnosis and hence treatment, may reduce the long-term effects of ADHD. Knowing the socio-demographic factors that are associated with ADHD, as well as the referral sources and the main reasons for referral will aid in creating awareness about this disorder.

2.6 Aim

To investigate the socio-demographic profile of, and referral patterns for preschoolers with a diagnosis of ADHD at CHBAH's Child/Adolescent and Family Unit, Gauteng Province, South Africa.

2.7 Objectives

In a group of preschoolers diagnosed with ADHD to:

1) Describe the socio-demographic characteristics;

2) Describe the sources of referral;

3) Describe the reasons for referrals;

4) Determine, if any, associations between the sources of referral and reasons for referral.

2.8 Hypothesis

Most children attending CHBAH CAFU Under-six ADHD clinic are males, referred mostly by health professionals for externalising symptoms, such as hyperactivity and behavioural problems.

CHAPTER THREE: METHODOLOGY

3.1 Study Design

A retrospective descriptive review was conducted in which data from clinical files of preschoolers with a diagnosis of ADHD was analysed.

3.2 Population and Sampling

The study population consisted of preschoolers who attended the CHBAH Child, Adolescent and Family Unit during the period 1 January 2017 to 31 December 2017

The inclusion criteria of the study were:

- Preschool age, that is, ≤ 6 years old;
- Diagnosis of ADHD;
- Attended CHBAH CAFU's 'Under-six ADHD Clinic' from 1 January 2017 to 31 December 2017.

Exclusion criteria of the study were

- Children older than six years;
- those not diagnosed with ADHD, or
- those diagnosed with ADHD before or after the stipulated time period.

Files for all eligible children were selected for review and data capturing.

3.3 Data collection

Patients' files were reviewed to ascertain who met the inclusion criteria for the study. Relevant files were identified based on the clinic register where patients' details are recorded when bookings for the clinic are made. Data, which included information on socio-demographics, referral sources and reasons for referral were abstracted from files in those who were eligible to be part of the study. Most of the data was obtainable from the CHBAH CAFU index clerking sheet completed for each new patient who attended the clinic. Data was extracted from patients' files by the investigator and loaded on a Microsoft

Excel spreadsheet. Extracted data included ‘Gender’, ‘Schooling’, ‘Primary caregiver’, ‘Household income’, ‘Referral source’, and ‘Reason for referral’ (Appendix 4).

Regarding the ‘Primary caregiver’ category, it was noted at numerous points that a parent may have received caregiving assistance from another relative, such as an aunt or a grandmother, or the mother’s newest partner, and both members play equal roles in raising the child in question. For situations such as these, two parents were chosen as the appropriate domain. This should not be assumed to have been both the biological parents of the child.

Referral sources are categorised as follows:

- Health professionals: Doctors (consisting of interns, registrars, medical officers, specialists) and nurses;
- Allied health professionals: psychologists, occupational therapists, physiotherapists, speech and language therapists, dietitians, social workers.

In the ‘Reason for referral’ category, the reason listed for the referral is documented. This ranges from symptoms such as hyperactivity (symptoms as per DSM 5 criterion), behavioural difficulties, such as aggression and destructive behaviours to more subtle symptoms such as inattention (any description as per DSM 5 criterion), developmental delay (delays in speech and language, motor function, cognitive and social skills). In the case of numerous reasons listed, the most emphasised reason was chosen as the primary reason. It was noted that there was generally a single symptom that would be alluded to as the most problematic, based on the referrer’s choice of words in their description.

3.4 Sample size

From an assessment of Z-scores of expected frequencies, a sample size of 150 patients would detect statistical significance for factors tested at the 5% level. Realistically, statistical significance could be expected with a minimum sample of 105 patients (the lowest number recommended).

3.5 Data analysis

Abstracted information was entered into a Microsoft Excel spreadsheet. Statistical analysis was performed using the R software version 3.5.0. All variables collected were categorical.

Data was analysed using proportions and graphically presented using pie charts, bar graphs and tables. To test for association between two proportions, the chi-squared test was used. A statistical significance level was accepted when $\alpha \leq 0.05$. In addition, a general linear model was used to analyse the reason (dependent variable) for referral provided by the referral sources (fixed factor).

3.6 Ethics

Permission was received from CHBAH psychiatry department and the hospital's Chief Executive Officer (CEO) (see Appendix 2). Unconditional ethics approval for this study was granted by the University of Witwatersrand's Human Research Ethics Committee (HREC), see Appendix 4. The principles as set out in the Economic and Social Research Council (ESRC) Framework for research ethics were strictly upheld. In this regard:

- Quality and integrity of the research were always upheld;
- Confidentiality and anonymity were upheld in the following ways:
    - Patient files were assigned numbers to identify them. This was done so as to avoid repetition of data, but by no means used to enable their identification for direct use in the study;
    - Linking data that will enable any patient's personal information to be revealed by any form of encoding of data was not kept;
    - There was no improper use of any information gathered from the files of patients.
- As this was a retrospective study, a waiver of consent was granted by the ethics committee, hence consent was not required from the individual subjects whose files were reviewed in the study with the understanding that doing so would not infringe on their human rights, or cause them harm in any way.

CHAPTER FOUR: RESULTS

A total of 152 files were reviewed.

4.1 Socio-demographic characteristics

Table 1 provides socio-demographic variables for preschoolers in this study. The data was pooled by sources of referral for each variable to produce overall totals for analysis. Of the 152 preschoolers, there were significantly more males than females (Table 1), with a male to female ratio of 3.3:1. The majority of the children in the study attended preschool. Just over half had two parents as caregivers, followed by those who had one parent. For most preschoolers with ADHD, household income was derived from a single source. which was significantly more than that of other sources (Table 1).

Table 2. Socio-demographic variables of preschoolers with ADHD at the CAFU and CHBAH. For each variable, the total number of patients per category and a percentage per variable are presented (n=152 for all variables).

Variable	Category	Value (%)	Statistics
Gender	Male	117 (73%)	$\chi^2_1 = 44.23$, $p < 0.001$
	Female	35 (27%)	
Schooling	Attending preschool	116 (76%)	$\chi^2_2 = 135.25$, $p < 0.001$
	Not attending preschool	33 (22%)	
	Unknown	3 (2%)	
Primary caregiver	Two parents	78 (51%)	$\chi^2_3 = 70.42$, $p < 0.001$
	One parent	58 (38%)	
	Family member	12 (8%)	
	Non relative	4 (3%)	
Household income	Dual income	34 (22%)	$\chi^2_4 = 66.42$, $p < 0.001$
	Single income	65 (43%)	
	Social grant	26 (17%)	
	No income	24 (16%)	
	Unknown	3 (2%)	

4.2 Sources of referral

Most referrals to CHBAH CAFU were made by health professionals (n=81, 53%), followed by (in descending order): allied health professionals (n=37, 24%), schools (n=20, 13%), unknown (n=7, 4.6%), family members (n=5, 3%) and other, which consisted of 1 community member (non-family), and the other a traditional healer (n=2, 1%) Figure 1.

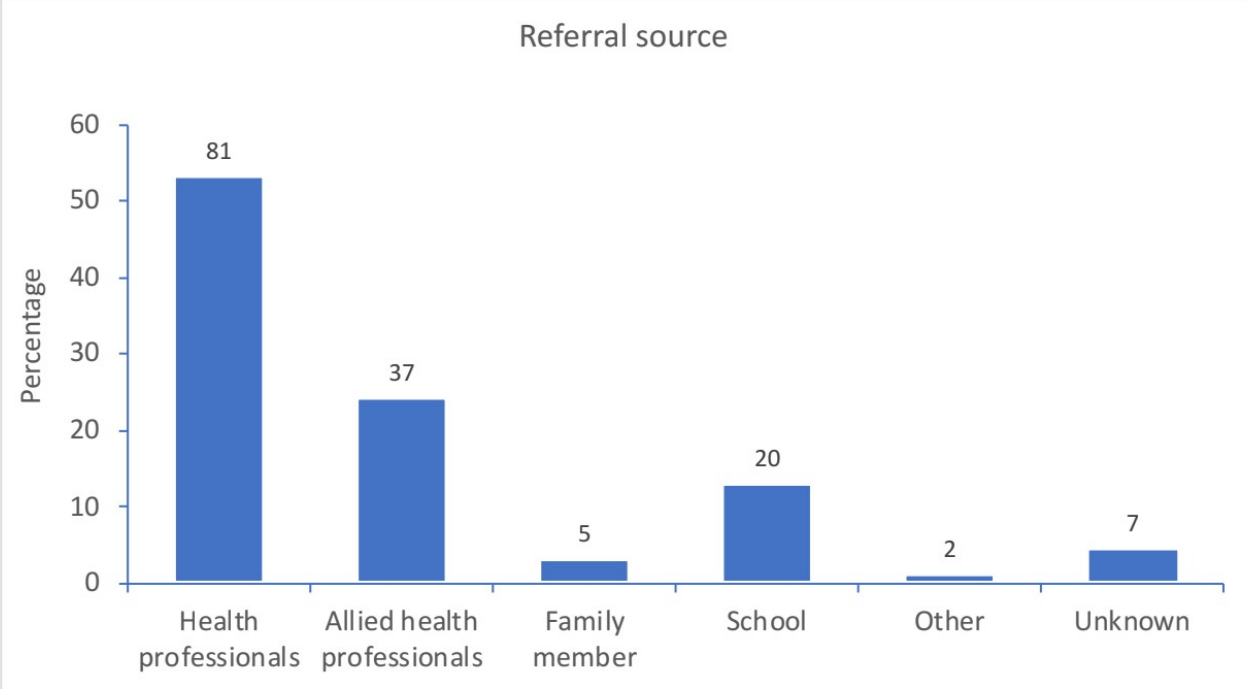


Figure 1. Sources of referral of preschoolers with ADHD at the CAFU, CHBAH.

The number of patients is shown above the bars.

4.3 Common reasons for referral

There were 17 known reasons for referral of preschoolers with ADHD to the CAFU and a small number of those in whom the reason for referral was unknown (Table 2). The distribution of the reasons differed significantly from chance ($\chi^2_{17} = 461.42$, $p < 0.001$). Most (n=65, 42.8%) of the referrals were for hyperactivity, followed by those with behavioural problems (n= 22, 14.5%) and developmental delay (n=15, 9.9%).

Table 3 Frequency distribution of the reasons for referral of the study population

Reason for referral	Number n	Percentage %
Behavioural problems	22	14.5
Behavioural problems and developmental delay	2	1.3
Behavioural problems & hyperactivity	3	2.0
Behavioural problems & inattention	1	0.6
Developmental delay	15	9.9
Developmental delay & behavioural problems	1	0.6
Developmental delay & hyperactivity	7	4.6
Developmental delay & internalising disorders	1	0.6
Developmental delay & other	1	0.6
Hyperactivity	65	42.8
Hyperactivity & behavioural problems	7	4.6
Hyperactivity & developmental delay	4	2.6
Hyperactivity & inattention	2	1.3
Inattention	8	5.3
Inattention & hyperactivity	3	2.0
Internalising disorders	2	1.3
Other	3	2.0
Unknown	5	3.3
Total	152	99.9

4.4 Comparisons between sources and reasons for referral

The reasons for referral of preschoolers with ADHD, by referral source, was compared (Table 4). Because of the small sample sizes, data from referral by family members, other and unknown sources were omitted from the analyses. Most referrals were made by health professionals, particularly for hyperactivity (n=44), followed by health professionals for behavioural problems (n=11).

Table 4. The relationship between the sources and reasons of referral in preschoolers with ADHD at the CAFU

Reason for referral	Referral source (n)					
	Allied health professionals	Family member	Health professionals	Other	School	Unknown
Behavioural problems	3	2	11	1	5	0
Behavioural problems and developmental delay	0	0	2	0	0	0
Behavioural problems & hyperactivity	1	0	1	0	1	0
Behavioural problems and inattention	0	0	0	0	1	0
Developmental delay	9	0	5	0	1	0
Developmental delay & behavioural problems	0	0	1	0	0	0
Developmental delay & hyperactivity	2	1	4	0	0	0
Developmental delay & internalising disorders	1	0	0	0	0	0
Developmental delay & other	0	0	1	0	0	0
Hyperactivity	10	2	44	0	6	3
Hyperactivity & behavioural problems	2	0	4	0	1	0
Hyperactivity & developmental delay	2	0	2	0	0	0
Hyperactivity & inattention	1	0	0	0	1	0
Inattention	5	0	2	0	1	0
Inattention & hyperactivity	0	0	1	0	2	0
Internalising disorders	0	0	1	0	1	0
Other	0	0	2	1	0	0
Unknown	1	0	0	0	0	4
Total	37	5	81	2	20	7

A chi-square test of independence was performed on a subset of the referral source categories (n=135), excluding the 'unknown', 'other' and 'family members', since these made up a very small portion of the total data set (Table 4). The analysis showed that the distribution of values deviated significantly from chance ($\chi^2_{30} = 23.31$, $p = 0.016$).

Contributions to the chi-square analyses were then used to ascertain which cells (that is, reasons for referrals by source) occurred greater than or less than chance. Three significant outcomes occurred

1. Allied health professionals referred a significantly greater number of preschoolers with developmental delay.
2. Health professionals referred a significantly greater number of preschoolers with hyperactivity.
3. Health professionals also referred significantly fewer cases of developmental delay.

CHAPTER FIVE: DISCUSSION

5.1 Socio-demographic characteristics of the study population

5.1.1 Gender

The male to female ratio for ADHD in school-age children ranges from 2:1 to 9:1 (Thapar and Cooper, 2016) and 12:1 (Regnart et al., 2014) in all school age children. It has been suggested that this male predominance may be because of diagnostic bias rather than any biological mechanism (Coles et al., 2012, Kiely and Adesman, 2015). Externalising symptoms of ADHD are more common amongst males and are therefore more easily noticed through disruptive behaviour in the academic environment (Coles et al., 2012, Kiely and Adesman, 2015, Gaub and Carlson, 1997) and referred for evaluation. Due to this referral bias, ultimately males are more likely to receive a diagnosis and treatment. Gender differences were, however, not found in impulsivity, academic performance, social functioning, fine motor skills, parental education or parental depression (Gaub and Carlson, 1997). This study found a male to female ratio of 5:1 amongst the preschool children with ADHD. This is similar to the rates of all school- age children and more specifically to the rate of 5:1 reported by Tandon and Perglika (2017) in their sample of preschool children".

However, there have also been studies that reported less pronounced gender differences in preschool children with ADHD. This could be attributed to the possibility that gender roles and behavioural norms are less well established in this age-group.

5.1.2 Schooling

Most of the children in this study with a diagnosis of ADHD (76%) were attending preschool. It is presumed that the diagnosis of ADHD predominates in the preschool attending population, where poor pre-academic skills (Thomaidis et al., 2017) become more evident in a structured environment, and where easy comparison can be made with the progress of their peers. Furthermore, research has found that parents of preschool-aged children with ADHD symptomatology may deem it part of their normal development

and thus delay their referral to healthcare services (Maniadaki et al., 2006), and in this way are poorer referrers than are schools. This is of concern and suggests that children not attending school are less likely to be diagnosed with the condition. School was also a notable area of referral in this study (n=20, 13%), but the deficiencies in the education system, as mentioned earlier in this paper, may render this an under-representation of the reality.

5.1.3 Primary Caregiver

South African statistics show that a higher proportion of preschool aged children (46%) live in single-parent (mother) households than with both parents (40%) (StatsSA, 2018). In this study, most children had two primary caregivers. This may possibly be explained by the study previously quoted in this paper, (Corkum et al., 2015), which suggests that children from single-parent households may find it more difficult to access health care than their two-parent counterparts, and therefore it is not surprising that those with access to tertiary health care, i.e. CHBAH, are from two caregiver households. This study, however, did not specify who the two caregivers were – whether biological parents, other relatives, or complex households. This makes it difficult to make full comparisons with the existing literature.

A large European study found that 81% of caregivers of school aged children with ADHD were married, and 27% with at least one other household member with ADHD (Flood et al., 2016). Family history may have been of benefit in exploring heritability in the population, but was not explored in this study. It may also have been of benefit to note as parental psychopathology has been described as a barrier to access to and adherence to treatment (Corkum et al., 2015). However, the reader is reminded that ADHD diagnosis has been on the increase over recent years, theorised to be partly due to increased awareness, and therefore, parental diagnosis of ADHD in their childhood may have been missed and therefore unknown.

5.1.4 Source of income

Recent South African statistics show that 33.5% of households do not have a single employed member and about 32% with only one employed member (StatsSA, 2018). Having a child with a diagnosis of ADHD who requires a great deal of supervision may add to the difficulties that already financially constrained South African households may encounter in securing employment, as unpredictable behaviours and medical appointments may affect attendance to work. Caregivers' difficulties in maintaining employment may also be explained by difficulties with their own psychiatric illnesses, as ADHD is known to be highly heritable (Corkum et al., 2015)

The fact that most (43%) of the children studied hailed from single income households is not surprising, given the fact that households who have no income will struggle with the logistics involved in accessing tertiary health care, as is the case in CHBAH.

It has also been established earlier in this study that families of lower SES are less likely to pursue treatment of ADHD (Corkum et al., 2015). This likely explains why the least (identifiable) income source found was that of 'no income'.

5.2 Sources of referral

Health professionals, were the highest referrers, followed by allied health professionals at 53%; this correlates with SA data which suggests that health professionals are the most frequent referrers to psychiatric facilities for the general preschool population, at 36.9% (Lumu et al., 2016). It is also not surprising, as CHBAH, in its entirety, being a tertiary institution, require referrals only from a secondary (clinical) source. Due to the unique services the CHBAH CAFU offers, exceptions are frequently made in accepting patients outside of the referral system. This may, however, still prove to be a significant enough barrier to patients who are not aware of this, and possibly bias in favour of the referrers who operate within the larger hospital referral system. Therefore, as previously alluded to, family members and teachers would not be able to present their referrals directly to the facility. Despite this, one study (Fanton et al., 2008) found high positive predicting power of paediatrician referral in predicting the preschoolers who would ultimately meet

the criteria for ADHD, suggesting that paediatricians are generally competent in identifying the child to refer. Another SA study (de Jongh et al., 2019) suggests that many preschool teachers do not have adequate training to identify barriers to learning such as ADHD, and this may explain the low referral rates of this group (13%).

Regarding family members, this paper has previously highlighted some of the barriers in the health-seeking behaviours for children with ADHD and this can result in delayed presentation to a health facility, if at all.

5.3 Reasons for referral

Hyperactivity was by far the most commonly referred reason. This correlates with literature which shows higher rates of referral of children with externalising symptoms, possibly as this is likely to be the most bothersome to others.

It is not surprising that allied health professionals – mostly comprising of occupational therapists and audiologists in this study, referred significantly more for developmental delay than the other sources, as this is within their area of expertise. Once they have identified the probable causes or contributing factors to the patient's presentation, they are then expected to refer on for management of the root cause. If ADHD is suspected, they would then follow the appropriate channels to get the patient seen by the CHBAH CAFU.

5.4 Comparison between source and reasons for referral

The fact that health professionals are significantly less likely to refer patients with inattentive ADHD maybe as a result of their lack of familiarity with the subtleties of the symptomatology, which may not fully present themselves during a consultation, as compared to their hyperactive counterparts who are likely to be uncooperative and therefore are easily identifiable even early in the consultation.

5.5 Strengths of the study

CHBAH CAFU is a one-of-a-kind facility that offers unique insights into children of this age group with the diagnosis of ADHD. Because of the uniqueness of the services offered by this facility, the strict rules that govern the tertiary referral system elsewhere in the hospital are not as strictly upheld, and thereby improving heterogeneity.

5.6 Limitations of the study

Despite the geographical heterogeneity of the patients studied, the study did not include those who may have met the criteria, but did not have access to tertiary medical care. As such, a substantial amount of data may have been missed.

The sample size was relatively small. A larger sample size, perhaps over a longer period of time may have yielded a more representative outcome of the variables in the study.

The omission of the type of caregiver has excluded a wealth of information which, in the context of the significant role that family history plays in ADHD, has not been explored.

Some studies suggest that race may play a role in the diagnosis of ADHD (Reyes et al., 2013). Furthermore, ethnicity may be associated with awareness and knowledge of ADHD and consequently their health-seeking behaviours (Corkum et al., 2015). SES may also have an influence on health-seeking behaviour and adherence to treatment (Corkum et al., 2015). These factors were, however, not explored in this study.

The information presented was pre-recorded information from the files of patients. Crucial information was at times scanty or lacking; and some may have been inaccurate for reasons such as misinterpretations or misunderstandings in what is known to be a busy clinical environment.

The exact age at which the diagnosis of ADHD was made in this under-six-year-old group was not recorded. It would have been interesting to note the median age of diagnosis of ADHD in this age group, to enable researchers compare with literature.

Comorbidity and treatment were not addressed in this study. This could have provided valuable insight into the clinical presentation of preschoolers with ADHD and other potential contributing factors that might influence their attention and behaviour.

5.7 Recommendations

In keeping with the findings of this study, the following is recommended:

- further studies with bigger sample size and more variables;
- Education, early detection and intervention at preschool level;
- Community health promotion and education by other organisations taking into consideration lack of preschooling education;
- Improved initiatives in training teachers in recognising the disorder and the referral process.

CHAPTER SIX: CONCLUSION

This research was successful in displaying some insights into the socio-demographic factors and the referral patterns of children under six diagnosed with ADHD at a tertiary facility in South Africa. It found that most children with ADHD are male, attending school, in two caregiver households, with one income source. Also, most are referred by health professionals for externalising symptoms. Most of the findings of this study correlated well with previous studies undertaken worldwide. It has been established that ADHD symptoms present earlier than school-going age, as previously proposed; and therefore, early identification is key in interrupting the trajectory of the illness, which ultimately results in a high cost to the individual, family and the economy at large.

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APPENDIX ONE: DSM-5 DIAGNOSTIC CRITERIA FOR ADHD

DSM 5 diagnostic criteria for ADHD

A: A persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development as characterised by inattention and/or hyperactivity/impulsivity.
Inattention – ≥6 of the following (if 17 years or older, only 5 required):

- often fails to give close attention to details or makes careless mistakes
- often cannot sustain attention in tasks or play activities
- does not seem to listen when spoken to directly (mind seems elsewhere)
- often does not follow through on instruction and fails to finish schoolwork (starts tasks and loses focus easily)
- often has difficulty organising tasks and activities
- often avoids or dislikes tasks requiring mental effort
- often loses things
- easily distracted
- forgetful in daily activities.

Hyperactivity and impulsivity – ≥6 of the following (if 17 years or older, only 5 required):

- often fidgets with hands or squirms in seat
- often leaves seat
- often runs or climbs about when inappropriate (adults have inner restlessness)
- unable to play quietly
- is often on-the-go or acts as if driven by a motor
- talks excessively
- blurts out answers before the question has been completed
- often has difficulty waiting his/her turn
- often interrupts or intrudes on others.

B: Several inattentive or hyperactive-impulsive symptoms were present before the age of 12 years (previously 7 years).

C: Several inattentive or hyperactive-impulsive symptoms are present in two or more settings (e.g. at home, school or work or other activities).

D: There is clear evidence that the symptoms interfere with social, academic or occupational functioning.

E: Symptoms do not occur exclusively during the course of schizophrenia or are not better explained by another mental disorder.[2]

ADHD is further categorised into three major types (American Psychiatric Association, 2013). These are:

I. ADHD combined type;
II. ADHD predominantly inattentive type;
III. ADHD predominantly hyperactive-impulsive type.

Further distinctions are made with regard to severity (American Psychiatric Association, 2013):

- Mild: Few, if any symptoms in excess of those required to make the diagnosis are present, and symptoms result in no more than minor impairments in social or occupational functioning;
- Moderate: Symptoms or functional impairment between ‘mild’ and ‘severe’ are present;

- Severe: Many symptoms in excess of those required to make the diagnosis, or several symptoms that are particularly severe are present, or the symptoms result in marked impairment in social or occupational functioning.

APPENDIX TWO: PERMISSION TO CONDUCT RESEARCH

GAUTENG PROVINCE
REPUBLIC OF SOUTH AFRICA

MEDICAL ADVISORY COMMITTEE

CHRIS HANI BARAGWANATH ACADEMIC HOSPITAL

PERMISSION TO CONDUCT RESEARCH

Date: 31st August 2018

TITLE OF PROJECT:

The Demographic Profile and Referral of Preschoolers with Attention Deficit/Hyperactivity Disorder (ADHD) attending a Child, Adolescent and Family Unit.

UNIVERSITY: Witwatersrand

Principal Investigator: Dr A Antwi-Anyimadu

Department: Psychiatry

Supervisor : Dr W Friedlander

Permission Head Department (where research conducted): Yes

The Medical Advisory Committee recommends that the said research be conducted at Chris Hani Baragwanath Academic Hospital. The CEO / management of Chris Hani Baragwanath Academic Hospital is accordingly informed and the study is subject to:-

- Permission having been granted by the Committee for Research on Human Subjects of the University of the Witwatersrand.
- The Hospital will not incur extra costs as a result of the research being conducted on its patients within the hospital
- The MAC will be informed of any serious adverse events as soon as they occur
- Permission is granted for the duration of the Ethics Committee Approval.

Recommended
(On behalf of the MAC)
Date: 31/08/2018

Approved/Not Approved
Hospital Management
Date: 03 09 2018

42 Hill of Good Hope

33 Springfield Road

Eland Gardens

Midrand

28 August 2018

Research Committee

Chris Hani Baragwanath Academic Hospital

Chris Hani Road

Diepkloof, Soweto

Dear Sir/Madam

Permission to do research

I hereby request permission to do research at Chris Hani Baragwanath Child & Adolescent Psychiatric Clinic. The topic of my proposed research is **The Demographic Profile and Referral of Preschoolers with Attention Deficit/Hyperactivity Disorder (ADHD) Attending a Child, Adolescent and Family Psychiatric Unit**. It will be a retrospective study of children under the age of six years old attending the Chris Hani Baragwanath Academic Hospital (CHBAH) Child, Adolescent and Family Unit (CAFU) from 1 January 2017 to 31 December 2017. With your permission, files from that period will be used for data collection for this study. The protocol of this study will be sent to the Human Research Ethics Committee and Research Committee in University of Witwatersrand for approval.

I hope you find the above in order.

Yours faithfully,

.....

Dr A. Antwi-Anyimadu

MBChB (UCT)

MP0749990

Wits Psychiatry Registrar (3rd year)

Permission Granted

P.T. [illegible]

31/08/2018

APPENDIX THREE: DATA COLLECTION SHEET

1. Socio-demographic factors

   a. Gender

Male	
Female	
Unknown	

   b. Schooling

Attending preschool	
Not attending preschool	
Unknown	

   c. Primary caregiver

One parent	
Two parents	
Family member	
Non relative	
State care	
Unknown	

   d. Household income

Dual income	
Single income	
Social grant	
No income	
Unknown	

2. Referral

   a. Referral source

Health professionals	
Allied health professionals	
School	
Family member	
Other	
Unknown	

b. Reason for referral

Developmental delay	
Behavioural problems	
Inattention	
Hyperactivity	
Internalising disorders	
Other	
Unknown	

APPENDIX FOUR: ETHICS CLEARANCE CERTIFICATE

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

R14/49 Dr Annette Antwi-Anyimadu

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M181065

NAME: (Principal Investigator)	Dr Annette Antwi-Anyimadu
DEPARTMENT:	Psychiatry Chris Hani Baragwanath Academic Hospital, Child Adolescent and Family Psychiatric Unit Under 6 ADHD Clinic
PROJECT TITLE:	The demographic profile and referral of preschoolers with Attention Deficit/Hyperactivity Disorder (ADHD) attending a Child, Adolescent and Family Psychiatric Unit
DATE CONSIDERED:	26/10/2018
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Dr Wendy Friedlander
APPROVED BY:	Dr CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	29/10/2018

This clearance certificate is valid for 6 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 October and will therefore be due in the month of October each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature

Date 18/11/2019

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX FIVE: UNIVERSITY CLEARANCE CERTIFICATE

UNIVERSITY OF THE
WITWATERSRAND
JOHANNESBURG

Private Bag 3 Wits, 2050
Fax: 027117172119
Tel: 02711 7172076

Reference: Mrs Sandra Benn
E-mail: sandra.benn@wits.ac.za

03 October 2018
Person No: 0515524R
PAC

Dr A Antwi-Anyimadu
P O Box 92834
Norwood
Johannesburg
2117
South Africa

Dear Dr Annette Antwi-Anyimadu

Master of Medicine: Approval of Title

We have pleasure in advising that your proposal entitled *The demographic profile and referral of pre-schoolers with Attention Deficit/Hyperactivity disorder (ADHD) attending a Child, Adolescent and Family Psychiatric Unit* has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences