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Chapter 11

Attention-Deficit/Hyperactivity Disorder (ADHD) as a Barrier to Learning and Development within the South African Context: The Perspective of Teachers

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Additional information is available at the end of the chapter

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1. Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) is a universal condition transcending cultural, socio-economic and racial barriers. It is considered to be the most common psychiatric disorder amongst children in the United States and Europe, with an estimated 3-10% of children being affected [1]. The situation in Africa does not appear to be much different and although there is a lack of knowledge with regards to ADHD on the African continent, it is believed that the disorder is as prevalent as it is in Western countries [1]. In South Africa specifically it is considered to be the most prevalent psychiatric disorder amongst children with a prevalence rate of approximately 10% [2]. As this has not been confirmed officially, it raises issues relating to possible over-identification of the disorder in South Africa. However, it is feasible that children present with comorbid attention difficulties, when taking into consideration the huge backlog in the education system and the high incidence of learning disorders and language difficulties as additional barriers to learning.

The South African education system is still struggling with the aftermath of Apartheid, which promoted exclusion in schools, not only based on race, gender, class, and ethnic background, but also on disability. This lead to the creation of a dual education system and learners, who did not meet the requirements of mainstream education, were placed in special education when educationalists considered it to be in the best interest of the learner [3]. With the abolition of Apartheid and the advent of the Constitution of the Republic of South Africa, Act No. 108 of 1996 [4], respect for the rights of all children regardless of variables such as race, gender, ethniticity, religion and ability was emphasised. This lead to the adaption of a new South African Education Policy, embedded in the philosophy of inclusive education and with its

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primary focus on "meeting the needs of all learners and actualising the full potential of all learners" [5, p.344].

Inclusive education is not uniquely South African and emerged as a key international policy when UNESCO's Salamanca Statement was adopted in 1994, at the World Conference on Special Needs Education in Salamanca, Spain [6]. The emphasis at the Salamanca Conference was on the development of an inclusive education system that would

> ...accommodate all children, regardless of their physical, intellectual, social, emotional, linguistic or other conditions. This should include disabled and gifted children, street and working children, children from remote or nomadic populations, children from linguistic, ethnic, or cultural minorities and children from other disadvantaged or marginalised areas or groups. [7]

It was further noted that inclusive education systems, must not only recognise and respond to the diverse needs of learners, but also make room for different learning styles and rates. In addition, it is important that education systems ensure the quality of education through the design of appropriate curricula and teaching strategies, whilst also using and involving appropriate community and other resources. [7]

Although inclusive education therefore has a universal philosophy and universal practices, in the South African context it needed to be indigenised to meet the needs of the South African education system. This was done partially through the adoption of an eco-systemic framework in viewing barriers to learning and development.

2. Eco-systemic framework

> Seen in different contexts, human nature, which I had previously thought of as a singular noun, became plural and pluralistic; for the different environments were producing discernible differences, not only across, but also within societies, in talent, temperament, human relations, and particularly in the ways in which the culture, or subculture, brought up its next generation. (Bronfenbrenner, 1979:p.xiii as cited in [8])

Urie Bronfenbrenner is widely known for his development of the eco-systemic theory which looks at the manner in which different environments and social contexts, including political, socio-economical, and cultural patterns, produce distinct differences in the way in which children develop. He argues that to truly understand a child, as well as his/her developmental difficulties, one must view the child holistically within his/her context [9]. The eco-systemic theory, which forms part of the broader social ecological model to understanding learning barriers and more recently titled the bio-ecological perspective [10], amalgamates ecological and systems theories to exemplify how a person's physical environment and the different

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levels of the person's social context are linked in dynamic, interacting, and interdependent relationships.

Therefore, on the one hand the eco-systemic perspective emphasises the importance of the impact that a person's physical environment can have on the development of the person. On the other hand, systems theory examines the multiple levels and groupings of a person's social context that function interdependently so that the whole is reliant upon the interaction of the parts and can only be understood if the different parts are examined. Furthermore, as the different levels of a person's social context is linked in every-changing, interacting and interdependent relationships; a shift in one system will impact the whole in a cyclical fashion.

Applied to ADHD within the South African context, the eco-systemic theory assists us in understanding how environmental factors such as lead poisoning [11], which are prevalent in the South African context [12-13], can have on the development of the disorder. Other environmental factors that are of particular importance in the development of ADHD [11] and prevalent in the South African context [14], include poverty and insufficient living conditions. In addition, the eco-systemic theory also assists us in understanding how the child's micro-, meso-, exo-, macro-, and chronosystems [10] can have on the developmental course of ADHD. Here factors such as family discord, a maternal history of psychiatric disorders and a particular parenting style, are of importance [11]. Therefore, applied to ADHD, the eco-systemic perspective helps us to understand that children cannot be viewed in isolation, but as part of the bigger whole and in a reciprocal relationship with it. Taking this into consideration, one of the major challenges in effectively addressing ADHD within the South African context is to understand the complexity of the disorder as seen in a particular context and environment [9].

3. Barriers to learning and development

Although the predominant paradigm in understanding learning barriers such as ADHD, used to be the medical-deficit model, a more social-ecological approach is applicable when introducing inclusive education into an education system as it shifts attention from viewing psychiatric disorders as caused by or located within the individual, to viewing the child as being part of a broader system that contains many risk and protective factors that either contribute to the development and maintenance of a particular difficulty, or the prevention thereof. The World Health Organisation [15] defines environmental factors such as poor socio-economic status and high crime rates that can increase the risk of the developmental of externalising difficulties such as ADHD, as risk factors. In contrast, factors such as supportive parenting styles and educational support that moderate the effects of ADHD and assist in the appropriate adaptation of children with this to the school environment, are seen as protective factors.

In adopting a more socio-ecological paradigm, there will therefore be a shift from using labels such as special needs to applying terminology such as risk and protective factors, or as it is noted in the South African policy documentation; barriers to learning and development [16]. Barriers to learning and development are defined as all factors that can impact upon learning

[17]. These barriers can occur within all levels of the eco-system and can be placed on a continuum; from intrinsic barriers that can be found within the individual, to extrinsic barriers which refer to factors outside the individual [17]. Some of the most prominent extrinsic barriers within the South African context include socio-economic barriers, negative attitudes towards difference and psychiatric disorders, inflexible curricula, inaccessible and unsafe building environments and schools, inappropriate and inadequate provision of support services, lack of enabling and protective legislation and policy, lack of parental recognition and involvement, and lack of human resource development strategies [16]. Some of the most prominent intrinsic barriers include language and communication difficulties, health difficulties such as HIV and tuberculosis, sensory impairments, intellectual and learning difficulties, and pervasive developmental disorders [17].

ADHD would be considered an intrinsic barrier as research has shown that genetic and biological factors such as an imbalance in the neurotransmitters noradrenalin and dopamine play an important role in the development of the disorder. It is however important to also take cognisance of the role that extrinsic barriers such as those noted above, as well as poor socio-economic circumstances, high crime rates, repeated trauma, parenting styles and parent-child interactions play in the maintenance and further developmental course of the disorder [15].

4. Teachers: A pivotal part of the eco-system

From an eco-systemic perspective, teachers can act as extrinsic barriers to learning and development when they act as risk factors in the developmental course of ADHD in particular learners in their classrooms. Likewise, teachers can also act as protective factors when their understanding of ADHD and support offered to the learners in their classrooms, positively impact on the developmental course of the disorder.

Teachers are often the primary source of identification and play a pivotal role in the diagnosis, management and intervention of ADHD. They have firsthand experience of the learner in the classroom situation; a setting which requires the learner to sit still, pay attention, adhere to instructions and interact with peers and adults in an appropriate manner. Teachers' knowledge and understanding will determine how they engage with and manage learners experiencing ADHD. Furthermore, their attitudes towards different forms of ADHD intervention would affect their support of these treatment methods and the learners in their classrooms. Early identification and intervention by teachers is vital, especially as a large percentage of individuals continue to have symptoms in adolescence and adulthood [18], which can impede their future wellbeing. It is important to take cognisance of the manner in which teachers' perceptions, knowledge and attitudes are influenced by contextual and socio-cultural factors, as shown in previous studies [1, 19-20].

It has however been found that teachers' understanding of ADHD is often based on myths and false beliefs. It has been reported that some teachers believe that ADHD is a direct cause of the intake of certain food additives and eating too many sweets [21]. Others are of the idea that ADHD is mainly as a result of biological abnormalities [11], or as a direct result of bad

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parenting and a lack of parental supervision [22]. It is essential to understand that if teachers have an incorrect understanding of ADHD and its causes and symptoms, it may lead them to actually support the presence of behaviours associated with ADHD, which can lead to inaccurate diagnosis [23].

Over the past decade, many research studies have been done on teachers' perceptions and knowledge of ADHD. In the United States, a sample of primary school teachers watched a video of a student displaying ADHD-like behaviours as well as those behaviours that are characteristic and unique to Oppositional Defiant Disorder (ODD). When examined, teachers were accurate in their evaluations of ADHD-like symptoms such as inattention and hyperactivity. However, when students displayed behaviours that belong solely to the domain of ODD, such as opposition and non-compliance, teachers automatically assumed that these behaviours were indicative of ADHD. Thus, teachers mistakenly assumed that children who displayed only ODD-like behaviours also exhibited ADHD-like behaviours [23]. A study conducted in Australia likewise revealed that teachers often provide parents and professionals with incorrect and inappropriate advice and information regarding the child who is displaying ADHD-like symptoms [21]. A study conducted in South Africa by [24] revealed that teachers are actually over identifying children with ADHD, as in the study 11.9% of the learners actually had ADHD, whilst teachers identified 15.4% of the learners to have ADHD. Thus, misunderstandings and misperceptions held by teachers may lead to inaccurate information being passed onto professionals, who carry out the task of making an actual ADHD diagnosis.

In support of these findings, further evidence reveals that teacher knowledge of ADHD tends to be very narrow and limited and even incorrect [21]. Three studies, as discussed in [21] were conducted in Australia over the last decade, which explored this area. One of the studies revealed that the teachers in the selected sample group were able to answer 60.7% of items in a questionnaire on ADHD. In a different study, the researchers administered the Knowledge of Attention Deficit Disorders Scale (KADDS) to a group of teachers. The findings of this study reflected that teachers knew more about the causes of ADHD, but possessed less information regarding treatment interventions for ADHD [21].

In South Africa, a study conducted in the peripheral areas of the Cape Town Metropole in the Western Cape, also employed the KADDS to assess 552 teachers' knowledge of ADHD [2]. Their study revealed that the participants did not have an adequate understanding of ADHD. An overall score of correct responses of 42,6% was obtained. An overall percentage of 35.4% was gathered for "don't know" responses, and 22% for incorrect responses [2].

These above results are consistent with a study conducted by [25]. In this South African study teachers' perceptions of their ability to identify and manage learners diagnosed with ADHD were investigated. Four out of five teachers did not consider themselves able to adequately manage ADHD symptoms, and some of the teachers misidentified and misunderstood certain symptoms of this condition. In a further study, [26] revealed that teachers do not have a sound understanding of the symptoms of ADHD, and the majority of teachers in the sample were unable to distinguish between inattention and ADHD. According to Venter (2011, as cited in [27]), teachers from poor black communities that teach at rural South African schools are the

ones who possess the most limited knowledge on the condition. Consequently, these children are physically and verbally punished as a result of their ADHD behaviour.

Conversely, a South African study conducted by [28], which included five schools situated in economically deprived areas and three school situated in economically affluent areas, showed different results to those yielded by [2]. It was revealed that the majority of teachers in this sample group in fact had in-depth knowledge and understanding of ADHD, and were acutely aware of the symptoms of ADHD. The teachers believed that their role in the classroom was crucial to the management of the condition. Furthermore, teachers in this study were very eager to learn and gain more information on the condition. However, this study consisted of a very small sample group and the results garnered appear to be more of an exception and stronger evidence exists for the fact that teachers generally have a poor understanding and lack of knowledge on the condition [2].

Research in the past decade, has explored if older teachers and those teachers who have had more years of teaching experience have better knowledge and understanding of ADHD. An Australian study conducted by [29], where 120 teachers completed a survey on what they thought and knew about ADHD, showed that teachers with more years of teaching experience perceived themselves to have greater knowledge on the condition than the less experienced teachers. However, the number of years of teaching experience of these teachers was not related to their actual levels of knowledge. The age of the teachers was also not linked to the teachers' level of knowledge and understandings of the condition. These results are confirmed by the findings by [2].

However, other research [30] reported that in fact younger teachers know more about ADHD than older ones, a finding which is confirmed by [31]. One explanation for this may be the fact that younger teachers notice the condition more in their classrooms compared to their older counterparts who have developed effective classroom behaviour management strategies. One researcher [32] believes that older teachers are much more rigid and set in their ways as compared to younger teachers, who are willing to be open, honest and adaptable to the needs of ADHD learners.

The question arises as to whether a teacher, who has obtained a more advanced level of education, consequently knows more about ADHD. A study [33] conducted in the United States, which aimed to investigate preschool teachers' past educational practices and their knowledge and understanding of ADHD, revealed that those teachers that obtained higher levels of academic training, such as a university education, performed on a superior level and obtained higher scores on the administered questionnaire than those teachers that only obtained a high school level of education.

The study by [29] also indicated that having taught a student with ADHD is related to that teacher's actual knowledge of the condition. Then the question arises as to whether training and exposure in the area, such as the reading of articles on the topic and the attendance of workshops, contributes to a teacher's level of understanding and knowledge on ADHD. A study by [34], answers this question in the affirmative, and revealed that the attendance of workshops on ADHD has a positive relationship with teacher knowledge and understanding

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of ADHD. In the study by [2], teachers' exposure to ADHD, which includes the number of workshops attended as well as the number of articles read was positively correlated to their overall knowledge and understanding of the condition.

In the study by [29] older teachers were more likely to attend workshops and engage in ADHD training than the younger teachers. Teaching experience and exposure to ADHD also increased the likelihood of teachers attending workshops. The more workshops the teachers attended, the more knowledge they had on the disorder, compared to the teachers who did not attend workshops. This was confirmed by the South African study conducted by [2]. Teachers' confidence levels in their ability to teach and deal with a child with ADHD was positively related to their overall knowledge of this condition. As every teacher will experience at least one learner with ADHD per year, it may become essential for teachers to receive pre-service training in the area of ADHD [35].

5. Knowledge and perceptions of ADHD held by a sample of South African foundation phase township teachers

Whilst understanding the pivotal role that teachers' knowledge and perceptions play in the identification and treatment of ADHD, this chapter aims to integrate the information from the studies above, with one particular South African study [36] that focussed on the knowledge and perceptions held by a sample of South African Foundation Phase township teachers.

A range of mainstream and special education schools exist in South Africa, which include private and government funded schools. Of the government funded schools, formally white schools were better funded and resourced in comparison to the black township, rural and informal settlement schools. There is no previous documented research on township teachers' perceptions of ADHD in South Africa, which prompted the current study. The study was conducted in Alexandra Township in Gauteng, which is one of the oldest townships in South Africa. It was proclaimed as a township for black persons in 1912, by the Apartheid regime which classified South Africans into four racial groups. Alexandra Township, with a population of about 350 000 people, covers an area of over 800 hectares of land. It consists of persons of different cultures and varying degrees of income and education and has a history of poverty, overcrowding as well as high levels of unemployment and crime.

5.1. Aim of the study

The overall aim of this study was to explore and assess the knowledge and perceptions of ADHD held by a sample of Foundation Phase (Reception year to Grade 3) teachers within a township setting. More specifically, the research aimed at exploring the teachers' general knowledge as well as their inadequate knowledge and misconceptions regarding ADHD, with emphasis paid to its' associated features, symptoms/diagnosis and treatment. Teachers' knowledge of ADHD was also investigated in relation to their demographic group.

In fulfilling the aim of the study, the following research questions were posed:

- What is the teachers' general knowledge of the content areas of ADHD in terms of:
  - Associated Features
  - Symptoms/Diagnosis
  - Treatment
- What are teachers' specific areas of inadequate knowledge and misconceptions in the content areas of:
  - Associated Features
  - Symptoms/Diagnosis
  - Treatment
- Is teachers' knowledge of the ADHD content areas different by demographic group in terms of:
  - Associated Features
  - Symptoms/Diagnosis
  - Treatment

5.2. Research design and methodology

This research was exploratory in nature as there is very limited documented research on ADHD in South Africa. The study garnered both qualitative and quantitative material which was analysed using numerical and descriptive statistics. For logistical and practical reasons, nine primary schools situated within the Alexandra Township were selected. Non probability, convenience sampling was employed as participation by the teachers depended on their availability and willingness to respond. As a result, the final sample of 100 female teachers who consented to participate in the study was not random in nature [37-38]. Foundation Phase teachers were chosen as the sample for this study due to the fact that they play an integral and primary role when it comes to the identification and recognition of ADHD-like symptoms [39]. Permission to undertake the investigation was sought from the Gauteng Department of Education and the ethics committee at the University of the Witwatersrand. A detailed information sheet detailing issues of anonymity and confidentiality regarding the particulars of the study was distributed to the principals of the schools and their teachers.

Clear instructions were given to the respondents during administration of the instrument and assistance was provided if they did not understand what was required. A questionnaire was chosen as the preferred instrument as it allowed for administration to a large group of subjects [38]. The questionnaire which was administered to the 100 participants was threefold in nature. It included; demographic/biographical questions, the Knowledge of Attention Deficit Disorders Scale (KADDS), as well as open-ended questions. Permission to use the KADDS measure was obtained from Professor Mark Sciutto.

In the first section of the questionnaire teachers were asked demographic questions such as their gender, age, educational level and number of years of teaching experience. Teachers

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were also asked to provide the number of hours of ADHD training that they had received (if any), as well as the number of evaluations and assessments that they had requested for children in their classes that they thought may have ADHD. Teachers were required to indicate the number of children that they had taught with a medical diagnosis of ADHD, how many workshops that they had attended on the topic as well as the number of articles that they had read on the condition. The teachers were also asked to rate their confidence levels to teach a child with ADHD. Lastly, teachers were required to indicate whether they had been asked for feedback by a professional, such as a doctor or psychologist, regarding a child in their class with ADHD in order to assess the child's medication. These questions were based on a questionnaire that was administered in the previously reported South African study conducted by [2].

The second section of the questionnaire consisted of the Knowledge of Attention Deficit Disorder Scale (KADDS). This scale was developed by [31] and was previously used in similar studies in South Africa, see [2] and Australia, see [40]. It was designed and consequently published to assess teachers' knowledge, of the symptoms, associated features and treatment of ADHD. The KADDS is a 39 item rating scale which elicits true and correct answers (T), false, incorrect and misperceived answers (F) and don't know answers (DK). Previous research conducted on the internal consistency of the KADDS total score, based on the original 36 items that constituted this scale, revealed high internal consistency ranging from.81 to.86 [31,41-42]. A similarly high internal consistency for the KADDS was found in the present study, with the Cronbach's alpha for the total score being.88. In terms of validity, KADDS scores are sensitive to teacher characteristics such as exposure to and interaction with a child with ADHD and prior training on this condition [31].

The last section of the questionnaire contained open- ended questions, where participants were given the opportunity to provide any additional comments or ideas that they had regarding ADHD. This information served to substantiate and support the quantitative results garnered by the research. In research terms, this method of using multiple sources of data to strengthen the trustworthiness of the data, is referred to as the triangulation of data [43].

5.3. Data analysis

Descriptive and inferential statistics and graphs were used to describe the sample respondents and the measurement scales, and to address the aims of the research study. In order to investigate the areas of inadequate knowledge and misconceptions held by teachers, summary statistics for the central tendency, variability and shape were computed at the item level of the KADDS subscales. These results were tabulated using a robot- type colour coding scheme whereby higher mean scores were shaded in deep green and shades of yellow through to red were used for relatively lower and low means respectively. Furthermore, the responses to each item were categorised as "don't know", incorrect responses or misconceptions, and correct responses, thereby enabling the examination of the extent of teachers' misconceptions versus poor knowledge at the item level of each of the subscales. This analysis was depicted graphically in the form of a stacked bar graph for the items of each subscale of the KADDS. In order to address the teachers' general knowledge of ADHD content areas in terms of their demo-

graphic group, a 1-way Analysis of Variance (ANOVA) was used. This was used to compare the mean responses of the respondents across the levels within each demographic variable on the three KADDS subscales. Line graphs were used to portray the differences between means in the case of significant ANOVA comparisons. Furthermore, the post hoc Scheffe test was used to indicate pairwise significances for significant analyses of demographic variables with more than two levels. In view of the non-normality of the score distributions, the parametric ANOVA tests were validated using the non-parametric equivalent Kruskal-Wallis test. Finally, the Chi squared test was used to compare the demographic characteristics of the respondents who opted versus those who did not opt for a future workshop on ADHD and profile line graphs were plotted to describe the two groups of these demographic variables. In addition, the t-test was used to compare the mean knowledge scores on the three KADDS subscales of these two groups. These analyses were complemented by the researcher's thematic analysis of the qualitative responses.

5.4. Findings

All of the 100 respondents, who agreed to participate in this study, were female. The average learner to teacher ratio in the schools include in the schools, were 50:1. Almost two-thirds of the teachers in the sample were older than 40years, with a negligible number of them in the 20-25 year category. Consistent with the age distribution of the teacher respondents, the majority (60%) had more than 11 years of teaching experience, 20% had 6-10 years teaching experience and 20% had 5 years or less. Almost a quarter of the sample had a university level of education, while the remaining individuals had college level training. Over half of the respondents expressed no confidence in their ability to teach children with ADHD. Regarding their knowledge of ADHD, two thirds of the teachers had received no ADHD training. Over half of the respondents (52%) claimed that they had taught children diagnosed with ADHD and had assisted with ADHD evaluations (59%). Almost 40% claimed that they had been asked for feedback by a doctor regarding a child with ADHD in their classroom.

The overall results of the KADDS questionnaire revealed that there is a substantial lack of knowledge about ADHD amongst the participants. Based on the results of Table 1 the overall percentage of correct responses to the 39 KADDS items was 34.9%. Nine of the 100 educator respondents scored zero on all 39 items of the scale.

	Mean	95% Confidence Interval for mean		Median	Standard deviation	Skew Ness
Associated features	30.4%	27.0%	33.8%	31.3%	17.2%	-0.21
Symptoms/ Diagnosis	47.9%	43.3%	52.5%	50.0%	23.3%	-0.51
Treatment	30.6%	26.5%	34.8%	30.8%	20.9%	0.10
Overall	34.9%	31.3%	38.6%	37.2%	18.2%	-0.33

Table 1. Summary descriptive statistics of the three content areas of ADHD

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Regarding the teachers' knowledge in terms of the Associated Features subscale, a mean score of 30.4% was garnered which was lower than the overall scale score of 34.9%, and based on the median score reflected in Table 1, half of the respondents answered fewer than 31.3% of these items correctly. The minimum scores of zero on the Associated Features subscale show 10 teachers who either did not know and/or who answered all the items of the subscale incorrectly. Of the three subscales, the highest mean (percentage correctly answered items) is for Symptoms/Diagnosis (47.9%). Even on this subscale, the average respondent answered approximately half of the items incorrectly. Nine of the 100 teachers scored zero on this Symptoms/Diagnosis subscale. The mean score of 30.6% on the Treatment subscale is comparably low in relation to the mean score on the Associated Features subscale which was lower than the overall KADDS score of 34.9%. The minimum scores of zero on this subscale show 15 teachers who either did not know and/or who answered all the items of the subscale incorrectly.

In order to determine the specific areas of poor knowledge and misconceptions of the content areas of ADHD, the scores of the educator respondents were examined at the item level for the three KADDS subscales. The low internal consistency reliability and low average inter-item correlation for the Associated Features subscale (Table 2) imply that some items of the subscale were answered correctly by teachers who answered other items incorrectly, and thus some items would be expected to have vastly different means from others. To reflect the items on which low and poor correct responses were obtained, a robot-type colour coding system was used whereby lower means were shaded red and highest means were shaded dark green with shades of orange for items in between. Item 1, which suggests that ADHD occurs in approximately 15% of school age children, item 27, which states that children with ADHD generally experience more problems in novel situations rather than familiar ones, item 30, which states that the problem behaviours in children with ADHD are distinctly different from the behaviours of non-ADHD children and item 39, which states that children with ADHD display an inflexible adherence to routine, all have very low percentage correct responses with means between 4% and 12%. These percentages are particularly low compared to items 13, which states that it is possible for an adult to have ADHD, item 31, which refers to the idea that children with ADHD are more distinguishable from normal children in a classroom setting as opposed to a free play situation and item 32, which states that the majority of children with ADHD evidence some degree of poor school performance during their early school years, which all have relatively high percentage correct responses with means between 60% and 62%. Apart from these three items, the mean score on the rest of the items of this subscale were all below 42%, and thus the standard deviations were low on these items and as a result on the whole subscale. This low response variability would have impacted negatively on the internal consistency reliability as Cronbach's alpha was dependent on the variability in the responses.

In order to investigate the low item scores, a distinction was made between misconceptions, i.e., incorrect responses, versus "don't know" responses. This distinction is displayed graphically for the Associated Features items in Figure 1 where bars shaded in blue indicate the percentage of misconceptions and bars shaded in red indicate incorrect responses for each item. Figure 1 shows that teachers have the greatest extent of misconception of ADHD on items 27, 1, 39 and 24, which states that a diagnosis of ADHD by itself makes a child eligible for

placement in special education. These items arranged in decreasing order of incorrect responses from 53% to 40% and the least extent on items 31, 13 and 32 (these items similarly arranged in decreasing order of incorrect responses from 14% to 11%).

Items	Mean	Median	Std.Dev	95% Confidence Interval for mean		Skewness
1: Most estimates suggest that ADHD occurs in approximately 15% of school age children.	4%	0%	20%	17%	23%	4.77
4: ADHD children are typically more compliant with their fathers than with their mothers.	22%	0%	42%	37%	48%	1.37
6: ADHD is more common in the 1st degree biological relatives (i.e. mother, father) of children with ADHD than in the general population.	34%	0%	48%	42%	55%	0.69
13: It is possible for an adult to be diagnosed with ADHD.	62%	100%	49%	43%	57%	-0.50
17: Symptoms of depression are found more frequently in ADHD children than in non- ADHD children.	41%	0%	49%	43%	57%	0.37
19: Most ADHD children "outgrow" their symptoms by the onset of puberty and subsequently function normally in adulthood.	25%	0%	44%	38%	51%	1.17
22: If an ADHD child is able to demonstrate sustained attention to video games or TV for over an hour, that child is also able to sustain attention for at least an hour of class or homework.	32%	0%	47%	41%	54%	0.78
24: A diagnosis of ADHD by itself makes a child eligible for placement in special education.	32%	0%	47%	41%	54%	0.78
27: ADHD children generally experience more problems in novel situations than in familiar situations.	5%	0%	22%	19%	25%	4.19
28: There are specific physical features which can be identified by medical doctors (e.g. paediatrician) in making a definitive diagnosis of ADHD.	20%	0%	40%	35%	47%	1.52
29: In school age children, the prevalence of ADHD in males and females is equivalent.	33%	0%	47%	41%	55%	0.73
30: In very young children (less than 4 years old), the problem behaviours of ADHD children are distinctly different from age-appropriate behaviours of non-ADHD children.	10%	0%	30%	26%	35%	2.71
31: Children with ADHD are more distinguishable from normal children in a classroom setting than in a free play situation.	60%	100%	49%	43%	57%	-0.41

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Items	Mean	Median	Std.Dev	95% Confidence Interval for mean		Skewness
32: The majority of ADHD children evidence some degree of poor school performance in the elementary school years.	66%	100%	48%	42%	55%	-0.69
33: Symptoms of ADHD are often seen in non-ADHD children who come from inadequate and chaotic home environments.	28%	0%	45%	40%	52%	0.99
39: Children with ADHD generally display an inflexible adherence to specific routines or rituals.	12%	0%	33%	29%	38%	2.37

Table 2. Associated Features item statistics

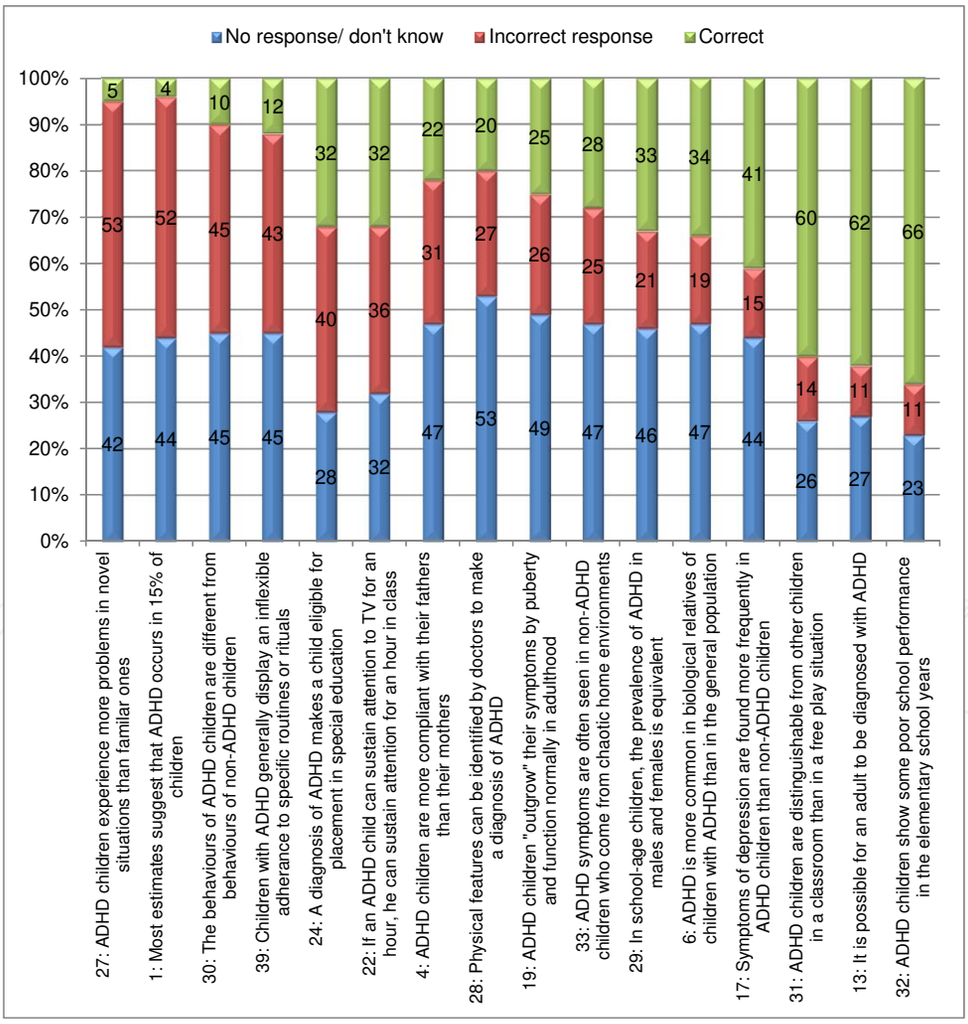


Figure 1. Categorised responses to Associated Features items

In line with the relatively higher mean score of the Symptoms/Diagnosis subscale compared to the other subscales (Table 1), the item means presented in Table 3 for this subscale are generally higher than those of the Associated Features subscale. The items that the teachers found most difficult were 11, which state that it is common for ADHD children to have an inflated sense of self-esteem or grandiosity and 38, which states that if a child responds to stimulant medications then they probably have ADHD, as the mean correct responses obtained were 18% and 23%, respectively. More than two-thirds of the teachers scored the following items correctly: item 3, which states that ADHD children are frequently distracted by extraneous stimuli; item 9, which states that ADHD children often fidget or squirm in their seats; item 21, which states that a child must present with symptoms in two or more settings to obtain an ADHD diagnosis and item 26 which states that ADHD children often have difficulties organising tasks and activities.

Once again, in order to investigate the low item scores for Symptoms/Diagnosis, a distinction was made between misconceptions, that is, incorrect responses, versus "don't know" responses. This distinction is displayed graphically for the Symptoms/Diagnosis items in Figure 2 where bars shaded in blue indicate the percentage of misconceptions and bars shaded in red indicate incorrect responses for each item. The figure shows that teachers have the greatest extent of misconceptions of ADHD Symptoms/ Diagnosis on item 7, which states that one of the symptoms displayed by ADHD children is that they are cruel to other people and item 14, which states that ADHD children often have a history of stealing or destroying other peoples' things (48% and 47% misconceptions respectively). Figure 2 also shows that teachers have the least extent of misconceptions on items 21 and 16; which states that two clusters of symptoms exist for ADHD, and items 3, 9 and 26 have between 9% and 5% misconceptions.

Items	Mean	Median	Std. Dev.	95% Confidence Interval for mean		Skewness
3: ADHD children are frequently distracted by extraneous stimuli.	70%	100%	46%	40%	54%	-0.89
5: In order to be diagnosed with ADHD, the child's symptoms must have been present before age 7.	36%	0%	48%	42%	56%	0.59
7: One symptom of ADHD children is that they have been physically cruel to other people.	31%	0%	46%	41%	54%	0.83
9: ADHD children often fidget or squirm in their seats.	78%	100%	42%	37%	48%	-1.37
11: It is common for ADHD children to have an inflated sense of self-esteem or grandiosity.	18%	0%	39%	34%	45%	1.69
14: ADHD children often have a history of stealing or destroying other people's things	21%	0%	41%	36%	48%	1.45

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Items	Mean	Median	Std. Dev.	95% Confidence Interval for mean		Skewness
16: Current wisdom about ADHD suggests two clusters of symptoms: One of inattention and another consisting of hyperactivity/impulsivity.	57%	100%	50%	44%	58%	-0.29
21: In order to be diagnosed as ADHD, a child must exhibit relevant symptoms in two or more settings (e.g., home, school).	68%	100%	47%	41%	54%	-0.78
26: ADHD children often have difficulties organizing tasks and activities.	77%	100%	42%	37%	49%	-1.30
38: If a child responds to stimulant medications (e.g., Ritalin), then they probably have ADHD.	23%	0%	42%	37%	49%	1.30

Table 3. Symptoms/Diagnosis item statistics

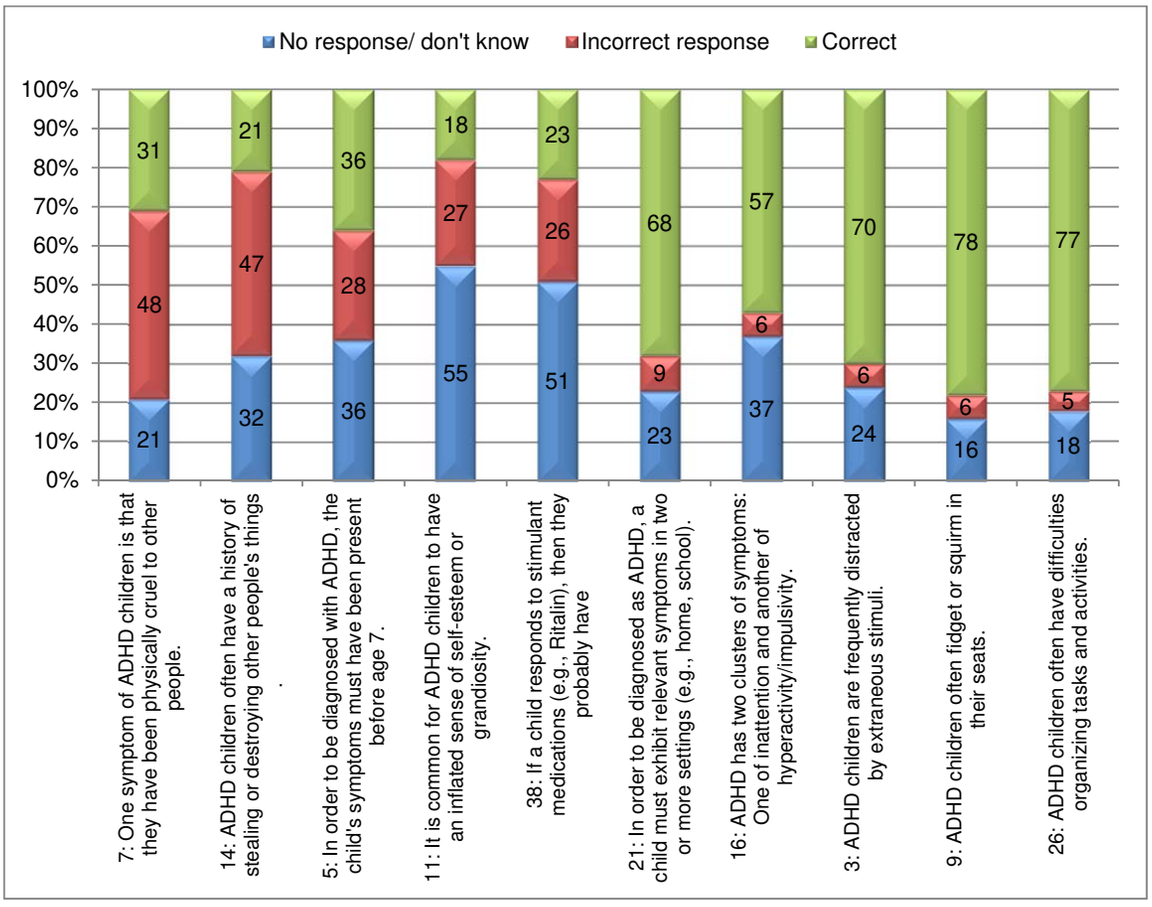


Figure 2. Categorised responses to Symptoms/ Diagnosis items

As for the Associated Features subscale, the knowledge level on the treatment subscale was poor (Table 4), with 14% or fewer of the teachers responding correctly to item 23, which states that the reduction of sugar intake leads to the reduction of ADHD symptoms; item 34, which states that behavioural interventions for children with ADHD focus primarily on the child's problems with inattention; item 35, which states that Electroconvulsive Therapy has been found to be an effective treatment for severe cases of ADHD and item 37, which states that research has shown that the prolonged use of medications leads to increased addiction in adulthood. Only on item 10, which states that parent and teacher training in managing an ADHD child are generally effective when combined with medication, did the majority of the teachers answer correctly.

Once again, the categorised responses of "don't know" versus misconceptions and correct responses are displayed in Figure 3 for Treatment items. This figure shows greatest misconceptions for items 23 and 34, which relate to dietary intake and ADHD and behavioural/psychological interventions for children with ADHD (53% and 47% incorrect responses respectively), and fewest misconceptions on item 35; which relates to electroconvulsive therapy as a treatment approach for ADHD and item 20, which states that medication is often used before other behaviour modification techniques are attempted.

Items	Mean	Median	Std. Dev.	95% Confidence Interval for mean		Skewness
2: Current research suggests that ADHD is largely the result of ineffective parenting skills.	37%	0%	49%	43%	56%	0.55
8: Antidepressant drugs have been effective in reducing symptoms for many ADHD	46%	0%	50%	44%	58%	0.16
10: Parent and teacher training in managing an ADHD child are generally effective when combined with medication treatment.	65%	100%	48%	42%	56%	-0.64
12: When treatment of an ADHD child is terminated, it is rare for the child's symptoms to return.	26%	0%	44%	39%	51%	1.11
15: Side effects of stimulant drugs used for treatment of ADHD may include mild insomnia and appetite reduction.	43%	0%	50%	44%	58%	0.29
18: Individual psychotherapy is usually sufficient for the treatment of most ADHD children.	19%	0%	39%	35%	46%	1.60
20: In severe cases of ADHD, medication is often used before other behavior modification techniques are attempted.	36%	0%	48%	42%	56%	0.59
23: Reducing dietary intake of sugar or food additives is generally effective in reducing the symptoms of ADHD.	7%	0%	26%	23%	30%	3.42
25: Stimulant drugs are the most common type of drug used to treat children with ADHD	34%	0%	48%	42%	55%	0.69

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Items	Mean	Median	Std. Dev.	95% Confidence Interval for mean		Skewness
34: Behavioral/Psychological interventions for children with ADHD focus primarily on the child's problems with inattention.	12%	0%	33%	29%	38%	2.37
35: Electroconvulsive Therapy (i.e. shock treatment) has been found to be an effective treatment for severe cases of ADHD.	14%	0%	35%	31%	41%	2.11
36: Treatments for ADHD which focus primarily on punishment have been found to be the most effective in reducing the symptoms of ADHD.	47%	0%	50%	44%	58%	0.12
37: Research has shown that prolonged use of stimulant medications leads to increased addiction (i.e., drug, alcohol) in adulthood.	12%	0%	33%	29%	38%	2.37

Table 4. Treatment item statistics

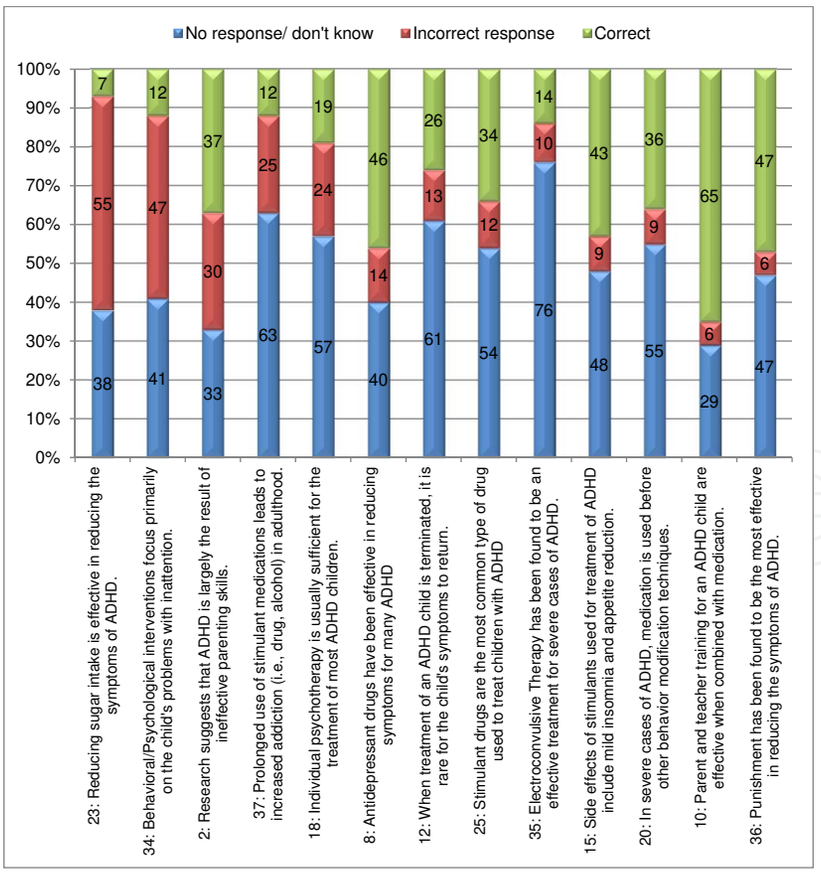


Figure 3. Categorised responses to Treatment items

In order to investigate whether the teachers' general knowledge of the content areas of ADHD differed in terms of their demographic group,their scores on the three ADHD content areas were compared across the levels of each of the demographic variables (Table 5) using 1- way Analysis of Variance (ANOVA).

	df	Associated Features – F	Associated Features - p	Symptoms/ Diagnosis - F	Symptoms/ Diagnosis – p	Treatment - F	Treatment – p
2. Age group	2	2.114		2.126		2.674	
3. Education level	1	15.780	***	13.919	***	6.409	*
4. Number of years of teaching experience	2	1.485		1.174		0.092	
5. Hours of ADHD training received	2	9.035	***	8.521	***	15.924	***
6. Evaluations/ assessments of children you thought may be ADHD	1	0.071		0.432		0.059	
7. Number of children taught with a medical diagnosis of ADHD	1	0.347		0.919		1.431	
8. Number of workshops attended on ADHD	1	11.508	**	13.928	***	20.087	***
9. Number of articles read on ADHD	2	6.538	**	18.290	***	20.170	***
10. Confidence to teach a child with ADHD	3	3.275	*	8.298	***	5.629	**
11. Teachers asked by a DR to assess the medication of a child with ADHD	1	12.506	***	21.961	***	16.809	***

Table 5. ADHD content areas compared across levels of demographic variables

Education and training is the common theme underlying these items reflecting significant differences on knowledge levels of the three ADHD content areas. Based on the direction of the means and the Scheffe post hoc tests for the significant ANOVA comparisons, the general trend of the means is that the more educated and trained teachers are more knowledgeable in each of the three ADHD content areas than are the less educated and trained teachers. Specifically, teachers with a university education score significantly higher than those with a college education [$F(1;93) = 15.780$, $p < 0.001$; $F(1; 93) = 13.919$, $p < 0.001$; and $F(1;93) = 6.409$, $p < 0.05$], teachers with more than ten hours of ADHD training score higher than

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teachers with none or few hours, [(F (1; 93) = 9. 035, p < 0.001; F (1; 93) = 8.521, p< 0.001; and F (1; 93) = 15. 924, p <0.05]. Those teachers that have attended ADHD workshops score higher than those who have not [(F (2; 93) = 11. 508, p < 0.001; F (2; 93) = 13. 928, p< 0.001; and F (1; 93) = 20. 087, p <0.05]. Those teachers who have read more than five ADHD articles score higher than those who have not read any ADHD articles [(F (2; 93) = 6. 538, p < 0.001; F (2; 93) = 18. 290, p< 0.001; and F (2; 93) = 20. 170, p <0.05]. In addition, those teachers who have been asked by a doctor to assess medication of a child with ADHD, and those who feel more confident to teach children with ADHD have significantly higher scores on the three ADHD content areas than other teachers (F (3; 93)= 3.275, p < 0.001; F (3; 93) = 8.298, p < 0.001 and F(3; 93) = 5.629, p< 0.05) and (F (1; 93)= 12. 506, p < 0.001; F (1; 93) = 21. 961, p < 0.001 and F(1; 93) = 16. 809, p< 0.05). Finally, it should be noted for all the significant comparisons of the demographic variables, knowledge levels on the Symptoms/ Diagnosis content area were significantly higher than on the Associated Features and Treatment content areas. The qualitative results from the questionnaire revealed that teachers are willing and eager to participate in workshops on ADHD, substantiated by 73% of the sample group indicating that they were in favour of this. Interestingly, the 27% of teachers who did not opt to attend the workshop tended to be older, less confident (Pearson Chi-square(3) = 6.41, p<0.10), tended to have attended fewer ADHD workshops, read fewer ADHD articles and had been less often asked by a doctor to assess the medication of a child with ADHD (Pearson Chi-square(1) = 5.00, p<0.05). However, although the mean scores on the three content areas of ADHD of the respondents who opted for the workshops were marginally higher than those who did not opt to attend, these differences were not significant.

Teachers were given the opportunity to provide additional comments at the end of the questionnaire. Four teachers commented that there exists a lack of resources at the disposal of teachers and that schools should have special classes for children with ADHD, and that schools have a dire need for psychologists to help identify the children who are displaying ADHD - like symptoms as soon and early on as possible. Some of the teachers explained that there is often a misdiagnosis of ADHD; and often an over diagnosis made by teachers of this condition. Teachers expressed that they would like to learn more about the identification, treatment and possible classroom interventions for learners with ADHD children.

5.5. Discussion

This study sought to investigate the knowledge and perceptions of ADHD held by Foundation Phase teachers within a township setting in South Africa. The results of the study suggested that there exists a substantial lack of knowledge about ADHD among this sample group. These findings are consistent with the body of literature which states that teachers generally lack knowledge and hold certain misconceptions in the area of ADHD [21]. Teachers in the present study were the most knowledgeable about the symptoms of ADHD, less knowledgeable about the associated features and the least knowledgeable about treatment for this condition; which supported the results reported in an Australian study [21].

Teachers' generally good understanding of the symptoms of ADHD which was shown in this research study, is supported by several other South African studies which were conducted

using a range of different teacher and school samples [2, 26, 28, 44]. Even though teachers in this study obtained the highest percentage of correct responses for the symptoms/diagnosis subscale of the KADDS, there were two specific items which resulted in the greatest extent of teacher misperception. Physical cruelty to other people and a history of stealing and destroying other people's things were perceived by the teachers as features of ADHD. The behaviours included in these two items are those that are characteristic of a Conduct Disorder and suggestive of an Oppositional Defiant Disorder [45], which the teachers in the present study may not have been aware of. These findings are consistent with the results of a study that was conducted in America [23].

In the present study, teachers were less knowledgeable about the associated features of ADHD, than they were about the symptoms, as half of the respondents answered less than 31% of the items on this subscale correctly. However, teachers obtained the lowest scores on the treatment subscale. Teachers in the present study possessed very poor and even incorrect knowledge regarding the treatment of ADHD. This finding has an important implication for teacher pre-service and in-service training, as teachers play an important role in the identification, management and treatment of ADHD [21]. Teachers in this study seemed to possess limited and even incorrect knowledge on the after effects of medication, and many of them believed that stimulant medications lead to drug and alcohol addictions in adulthood. Nevertheless, the majority of the teachers in the current study were aware that parent and teacher training in managing a child diagnosed with ADHD combined with medical treatment, was generally an effective and preferable method of treatment for this condition.

In line with the results of a number of other studies [2, 46], a large number of teachers in the present study incorrectly believed that the alteration of diet and the reduction of sugars and food additives would lead to the alleviation of ADHD symptoms. Few studies have supported the idea that the alteration of one's diet alleviates symptoms of ADHD, and in fact labels this belief as a common myth [15].

Among the sample group in this study, there existed a clear lack of knowledge on the epidemiology of ADHD, as a very low percentage of correct responses was obtained for the item which stated that most estimates suggest that ADHD occurs in approximately 15% of school age children. As pointed out by the study conducted by [23], if teachers are unaware of how many students in their classrooms have ADHD, it may lead to the condition being overlooked and unidentified, or conversely, it may lead to the teacher attributing many of a child's unruly and uncharacteristic behaviours to ADHD resulting in incorrect referrals [2].

Poor academic performance is often considered as one of the most prominent factors associated with ADHD, and students with ADHD are at an increased risk for grade retention and school failure [15]. Teachers in the present study seemed to be aware of this, and results revealed a large number of correct responses for the questionnaire item which looked at the idea that the majority of ADHD children evidence some degree of poor school performance in the elementary school years.

In this study, while the age of the teachers was unrelated to their overall level of ADHD knowledge, their educational level was positively related to this variable. The higher their level

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of education, the more knowledge they possessed on ADHD, possibly as a result greater exposure to this condition. Unlike the findings of [31], teachers' knowledge of ADHD was unrelated to their number of years of teaching experience in this study. An important finding for school administrators is the result that teachers who previously attended training programmes and workshops and those that were exposed to ADHD by means of written articles, all knew more about the condition than those teachers with less training and exposure in the area. Furthermore, teachers who felt more confident to teach a child with ADHD obtained higher scores on the KADDS, and thus knew more about the condition. This finding supports the results of studies conducted by [2, 31], where the more confident teachers had more knowledge on ADHD.

It was noted in this study, that it was the younger, more confident, more experienced teachers who wanted to participate in workshops on ADHD. The teachers also suggested that the workshops include a section on treatment, which is an area where knowledge is seemingly lacking. The older, more inexperienced teachers were those who were reluctant and disinterested to partake in workshops. One reason for this may be because the older teachers are more set in their ways, and are thus more reluctant to engage in and learn new material.

The finding may be related to what Martin Seligman calls learned helplessness. This is once an "individual learns that he or she is not in control, the motivation to seek control may be shut down, even when control later becomes possible [47, p.252]. Due to the lack of resources within the townships in South Africa and the possible lack of options that some of these teachers are faced with, they may have come to learn that they are not in control of the situation, and often what they do is to no avail. Thus, when a workshop is offered to them, they may have learned that they are not in control, and consequently they do not believe that the workshop will be of assistance and benefit to them.

5.6. Implications of the research

Results of the study imply that South African Foundation Phase teachers do not have adequate knowledge or sufficient understanding of ADHD. Teachers seem to have some information on the symptoms of ADHD, and less on the associated features and treatment for the condition. It is therefore important that training programmes or workshops address these gaps in the teachers' knowledge regarding the condition. Overall, the majority of teachers in this study expressed willingness to participate in workshops and training programmes on ADHD. Teachers also indicated that there is a lack of resources at the township schools to aid in the recognition and management of the condition. It is essential that the South African Department of Education becomes aware of these issues and provides teachers with the necessary training and ongoing support to facilitate the learning and schooling experience and holistic development of children with ADHD. This is of particular importance if inclusive education is to be implemented successfully.

5.7. Limitations of the study

The following were some of the limitations of the present research study:

- The sample for the study was obtained on a strict voluntary basis; using a purposive, non probability sampling method. The current sample is not representative of the entire population of Foundation Phase township teachers. Responses to the questionnaire were very much dependent on the teachers' availability and willingness to participate in the study. A sample of 100 teachers from a specific geographic location was obtained, and there were no male participants. Thus, the sample used in the study was small and narrow. For these reasons, issues with generalisability arose and therefore widespread conclusions from the results cannot be drawn.
- English is not a first language for many of the teachers that participated in the research study. It is unknown to what extent the teachers' responses to the questionnaire were hampered by language related issues, which similar research studies conducted in the future would have to consider. The construct validity of the measuring instrument used was therefore a possible limitation of the study.
- There is limited local literature and research on ADHD. Further work is necessary to develop and contextualize international developments in relation to the unique South African context.

5.8. Suggestions for future research

The following suggestions are made for future research:

- The majority of teachers in this study were willing to participate in workshops related to ADHD training. Future researchers could focus on creating and providing training programmes that would bridge the gaps in knowledge about ADHD and its causes, symptoms and treatment.
- After the implementation of teacher training and workshops, follow up programme evaluation studies and longitudinal research would be beneficial. This research could serve as a springboard for future workshops and educational programs to be implemented at schools at a national level.
- Broader teacher samples from public, private, rural and township schools need to be considered in future ADHD studies.
- Future research could focus on creating awareness and gathering resources to aid in the recognition and management of the condition at schools. It is essential that teachers receive the necessary training and ongoing support to facilitate the learning and schooling experience of children with ADHD.

6. Conclusion

This chapter primarily focused on one particular South African study [36] that sought to investigate the knowledge and perceptions of ADHD held by Foundation Phase teachers in a township in Gauteng. The results of the study were compared to local and international

research conducted in the last decade. After an in depth analysis of the results of the study and other research conducted, the chapter highlighted that the lack of knowledge that teachers has, as well as the misperceptions they hold regarding ADHD, need to be addressed as teachers play a vital role in the identification, diagnosis, referral and treatment process of ADHD. Inaccurate information about ADHD can lead to inaccurate referrals, resulting in the incorrect information being relayed to parents and doctors, which in itself has negative effects and consequences for individuals' diagnosed with the condition. In addition the chapter also noted the need for more workshops and programmes to become available to teachers to aid them in the recognition and management of ADHD in their classrooms. Overall, the chapter highlighted the need for more research to be conducted in the area of ADHD in South Africa, in order for every learner to maximise his or her potential and to succeed within the South African inclusive education classroom environment.

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