EFFECT OF ATTENTION-DEFICIT-HYPERACTIVITY-DISORDER TRAINING PROGRAM ON THE KNOWLEDGE AND ATTITUDE OF PRIMARY SCHOOL TEACHERS IN KADUNA, NORTH WEST NIGERIA

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DECLARATION

I hereby declare that this study or part of it has not been, and will not be submitted for any other diploma, fellowship, degree or any other examination

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Lasisi Marufah Dupe

CERTIFICATION BY SUPERVISORS

DEDICATION

To the teachers, at all levels of the education ladder, who painstakingly impact knowledge on all who cross their path.

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KEY TO ABBREVIATIONS

ADHD	Attention deficit hyperactivity disorders
ASD	Autistic spectrum disorders
CBT	Cognitive behavioural therapy
CDC	Centers for Disease Control and Prevention
Contd	Continued
DBD	Disruptive Behaviour Disorder
DISC	Diagnostic Interview Schedule for Children
DSM-IV	Diagnostic Statistical Manual, Fourth edition
DSM-IV-TR	Diagnostic Statistical Manual, Fourth edition-Text Revision
DSM-V	Diagnostic Statistical Manual, 5th edition
ICD-10	International Classification of Diseases, 10th edition
IQ	Intelligence Quotient
IRP-15	Intervention Rating Profile for Teachers
KADDS	Knowledge of Attention Deficit Disorders Scale
KBIQ	Knowledge of Behavioural Intervention Questionnaire
MTA	Multimodal Treatment Study of Children with ADHD
NSCH	National Survey of Children's Health
PPS	Probability-proportional-to size
SPSS 16	Statistical package for social sciences, version 16.0 Software
SRAQ	Self Report ADHD Questionnnaire
SUBEB	State Universal Basic Education Board
TORN	Table of Random Numbers
U.S.	United States
UK	United Kingdom

ABSTRACT

Background: Attention deficit hyperactivity disorder (ADHD) is the most common childhood neuro-behavioural disorder with associated significant long-term impairments such as academic underachievement, learning disability, reduced self-esteem and anti-social behaviour. Teachers are in a uniquely advantageous position to detect possible cases, refer for diagnostic assessment, implement behavioural programmes, and support the treatment received by affected children. However, many teachers in mainstream education lack training on dealing with pupils experiencing behavioural challenge to learning in northern Nigeria.

This study thus aimed to assess the effect of an ADHD training program on the knowledge and attitude of primary school teachers in Kaduna, Nigeria as well as explore the factors impacting on the level of knowledge and attitude.

Methodology: A quasi experimental study was conducted among 159 primary school teachers in seven primary schools with 84 teachers in the intervention group and 75 in the control group. Teachers in the intervention group were trained using the ADHD training program for 3 hours in the first session and 1.5 hours in the second (booster) session 2 weeks later. For the outcomes measures (a) ADHD knowledge questionnaire, (b) ADHD Attitude scale and (c) knowledge of Behavioural Intervention questionnaire were administered to both groups at pre training and post training. The measures were repeated for the intervention group a week after the second (booster) session, along with a Client satisfaction survey. Data analysis was conducted using SPSS.

Results: The teachers had overall percentage score of 40.32% on the knowledge of ADHD, 57.3% on the knowledge of behavioural intervention and negative attitude towards pupils with

ADHD. The ADHD training program demonstrated a statistically significant increase in mean knowledge score for ADHD (t = 5.270, df = 145, p<0.001), Knowledge of Behavioural Intervention (t = 3.594, df = 145, p<0.001), and improvement in attitude in the intervention group (t = -2.838, df = 145, p<0.001) compared with the controls post intervention. Analysis of co-variance (ANCOVA) (controlling for baseline scores and other relevant covariates) confirmed treatment effects for all three outcome measures. The intervention accounted for: (a) 21% of the variance in the post intervention ADHD Knowledge scores {F (1,143) = 38.1, p = 0.000} with large Cohen's *d* Effect Size of 0.9. (b) 7.1% of the variance in post intervention Attitude scores {F (1,143) = 11.0, p = 0.001} with moderate Cohen's *d* Effect Size of 0.5, and (c) 6.2% of the variance in the post intervention scores on behavioural intervention questionnaire {F (1,143) = 9.5, p = 0.002} with moderate Cohen's *d* Effect Size of 0.6.

The post booster measures showed statistically significant additional increase only in knowledge of ADHD (t = -2.116, df = 74, p<0.038).

Conclusions: The teachers had limited knowledge of ADHD and negative attitude towards pupils with ADHD. The training program significantly improved the knowledge and attitude of the teachers in the intervention group. Considerations should be given to incorporating ADHD training programs into teacher-training curricular, with regular reinforcement through in-service training.

Key words: ADHD, training, teachers, Kaduna, Nigeria

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Attention deficit hyperactivity disorder (ADHD) is the most common childhood neuro-behavioural disorder which typically begins in childhood and often persists into adulthood (Sarraf et al., 2011). It results in significant long-term impairments in the social, educational and occupational functioning of affected individuals (Sadock et al., 2009) (Rief, 2005). Those with ADHD are at risk of academic underachievement (DuPaul & Stoner, 2003) (Pfiffner & Barkley, 1990) as well as diagnosis of learning disability, lowered self-esteem, social rejection (Bagwell et al., 2001) (Hodgens, Cole, & Boldizar, 2000) and anti-social behaviour (Barkley, DuPaul, & McMurray, 1990) (DuPaul & Stoner, 2003). Although it has been reported that the symptoms of hyperactivity and impulsivity diminish with age, secondary problems including antisocial behaviours (such as stealing, fighting, lying or vandalism) often emerge leading to, in some cases, a greater school dropout rate and emotional adjustment problems (DuPaul & Stoner, 2003). Also, 15% of children with attention deficit hyperactivity disorder will continue to have the disorder as adults and children with ADHD are at risk of socio-economic disadvantage in adulthood (Gale´ra et al., 2012).

1.2 Statement of the Problem

Attention deficit hyperactivity disorder is a neuro-behavioural developmental disorder affecting about 3-5% of the world population under the age of nineteen years (Biomedical Testing, 2009). The Diagnostic Statistical Manual, Fourth edition-Text Revision (DSM-IV-TR) reported that 3–7% of school-aged children have ADHD (American Psychiatric Association, 2000). However, most recent surveys have estimated significantly increased prevalence rates, from 6.9% in 1998

to 9.0% in 2009, shown in children aged 5–17 years in the United States (Akinbami et al., 2011). Data from the 2007 National Survey of Children's Health (NSCH) also indicated an increase in the prevalence of ADHD (Centers for Disease Control and Prevention (CDC)., 2010). In this survey, the magnitude of increase was largest among older teens especially in the oldest age group of 15-17 years, multiracial and Hispanic children, and children with a primary language other than English (Centers for Disease Control and Prevention (CDC)., 2010). In Nigeria, Ambuabunos et al., (2011) found a prevalence rate of 7.6% for ADHD among primary school pupils aged 6-12 years in Edo state while Egbochuku & Abikwi (2007) reported a prevalence of 23.15% among primary one to six pupils with the age range of 5 to 12 years in Benin city, Edo state. There is a general paucity of epidemiological data on ADHD among children and adolescents in northern Nigeria.

Teachers are in a uniquely advantageous position for detecting possible cases and establishing diagnosis as well as implementing, evaluating and supporting the treatment received by children with ADHD. A preliminary needs assessment carried out in primary schools in Southwest Nigeria showed that mental health problems such as depression and attention deficit hyperactivity disorder were common; and teachers recognised the need to address these problems within school settings (Ibeziako et al., 2009). The interaction between teachers, classroom strategies and pupils experiencing behavioural barriers (such as attention deficit hyperactivity disorder) to learning in a system of inclusive education results in multiple dynamics on different levels. However, many teachers in mainstream education lack training on dealing with pupils experiencing behavioural barriers to learning. This study thus aimed to assess the impact of an ADHD training program on the knowledge and attitude of primary school teachers in Kaduna, Nigeria as well as explore the factors impacting on the level of knowledge and attitude.

1.3 Justification for the Study

Nigeria has a predominantly youthful population with about 45% of the population being below the age of 15 years (Nigeria Demographics Profile, 2013). These children spend most of their time in classrooms and other school settings where they are expected to follow rules, act in socially appropriate ways, participate in academic activities, and not interrupt the learning development or activities of others. Approximately one child in every classroom of 25 children has attention-deficit-hyperactivity-disorders. Thus, teachers need to be adequately prepared to teach and meet the individual needs of all students including those with ADHD. The knowledge that teachers have about ADHD influences their behaviour and attitudes towards children with this condition. If this intervention is found to be effective, inclusion of ADHD training into the teaching curriculum could be advocated for. This way affected children could be identified early, appropriately referred and effectively managed.

1.4 Research Questions

1. What is the baseline level of knowledge of attention-deficit-hyperactivity-disorders and its behavioural management among primary school teachers?
2. Will there be difference in the level of knowledge before and after training in the intervention group?
3. Will there be a difference in the level of knowledge of ADHD among those who had training and those who did not?
4. What are the factors associated with the baseline level of knowledge of ADHD and its behavioural management among primary school teachers?

1.5 Aim and objectives of the study

1.5.1 The overall aim of this study is:

To assess the effect of attention-deficit-hyperactivity-disorder training on the knowledge and attitude of primary school teachers in Kaduna, North West Nigeria compared with those not trained , and explore the factors impacting on the level of knowledge and attitude among the primary school teachers to improve early detection and referral for management.

1.5.2 The specific objectives of the study are:

1. To determine the baseline level of knowledge of ADHD, its behavioural management and attitude towards ADHD among primary school teachers.
2. To assess the effect of training on the level of knowledge of ADHD, its behavioural management and attitude towards ADHD among primary school teachers
3. To determine the factors associated with the baseline level of knowledge of ADHD and its behavioural management.

1.6 Null Hypothesis

1. There will be no difference in the level of knowledge of ADHD before and after training in the intervention and control groups.

1.7 Outcome Measures

1.7.1 Primary Outcome Measures

1. Knowledge of ADHD among the primary school teachers.

2. Knowledge of behavioural management of ADHD among the primary school teachers

1.7.2 Secondary Outcome Measures

1. The level of satisfaction with the training.
2. The attitudes of teachers towards children with ADHD.
3. The correlates of baseline level of ADHD knowledge

CHAPTER TWO

LITERATURE REVIEW

2.1 Definition of ADHD

ADHD is a neuro-behavioural developmental disorder characterized by developmentally inappropriate behaviours of inattention, impulsivity and hyperactivity resulting in functional impairment in academic, occupational, family and social functioning (Ahmadlou, Adeli, & Adeli, 2012). The scientific consensus in the field and the consensus of the National Health Institute of the World are that ADHD is a disorder which impairs functioning and that many adverse life outcomes are associated with it.

2.2 Aetiology

The causes of ADHD are still unknown (De La Fuente et al., 2013; Thapar et al., 2013) and no single risk factor explains ADHD. Genes, pre and peri natal risks, psychosocial factors and environmental toxins have all been considered as potential risk factors (Thapar et al., 2013). ADHD is considered one of the most heritable disorders with an estimated mean heritability of 75% (Faraone et al., 2005). First degree relatives of those with ADHD are two to eight times more likely than relatives of unaffected individuals to also show ADHD (Faraone et al., 2005). Twin studies in many different countries show high heritability rates for ADHD of around 71–90% (Faraone et al., 2005; Nikolas & Burt, 2010). All five published adoption studies of ADHD are consistent in showing a strong inherited contribution (Thapar et al., 2013). Many different environmental factors have been reportedly associated with ADHD, but it has been difficult to identify which are definitely causal (Lahey, D'Onofrio, & Waldman, 2009). It has been

suggested that many observed associations could arise as a consequence of child and/or parent psychopathology or disposition (e.g. negative mother–child relationship). They could also represent the effects of an unmeasured 'third variable' (Thapar et al., 2013). The environmental factors that have been most commonly studied in relation to ADHD include prenatal and perinatal risk factors such as Maternal smoking during pregnancy, maternal stress during pregnancy (Glover, 2011), Moderate maternal alcohol use during pregnancy and exposure to illicit substances (Linnet et al., 2003), low birth weight and prematurity (Bhutta et al., 2002). Other environmental risks factors that have been implicated in relation to ADHD include organic pollutants such as pesticides and lead (Nigg, 2008), nutritional deficiencies such as zinc(Arnold & DiSilvestro, 2005), magnesium (Kozielec & Starobrat-Hermelin, 1997) and polyunsaturated fatty acids (Spahis et al., 2008).

2.3 Comorbidities

ADHD shows co-morbidity with a wide variety of problems (Taylor, 2011). Recent twin studies suggest that shared inherited factors contribute to the co-morbidity (Ronald et al., 2008). These associations are with lower IQ and intellectual disability, conduct disorders, specific learning and developmental problems (e.g. reading disability and autistic spectrum disorders) (Rutter, 2011). The close clinical relationships, shared genetic risk factors, coupled with other shared features, notably an early age of onset and male excess, provide a strong argument for considering ADHD as one of a group of neurodevelopment disorders (Rutter, 2011). However, the argument against this point is that ADHD also shows a high level of co-morbidity with other psychiatric and behavioural disorders, notably conduct problems/antisocial behaviour, alcohol and substance misuse and mood disorders that is explained by shared heritability (Cole et al., 2009).

2.4 Prevalence

The DSM-IV-TR reported that 3–7% of school-aged children have ADHD (American Psychiatric Association., 2000). However, most recent surveys have estimated significantly increased prevalence rates, from 6.9% in 1998 to 9.0% in 2009, shown in children aged 5–17 years (Akinbami et al., 2011). Data from the 2007 National Survey of Children's Health (NSCH) also indicated an increase in the prevalence of ADHD (Centers for Disease Control and Prevention, 2010).

In Nigeria, Ambuabunos et al. (2011) conducted a cross-sectional study between February and August 2006 among 1473 public primary school pupils aged 6-12 years in Egor Local Government Area of Edo State. The pupils were screened with the Disruptive Behaviour Disorder (DBD) Rating Scale to identify children who had ADHD symptoms as contained in the DSM –IV and compare with randomly selected controls. They found a prevalence rate of 7.6% for ADHD. Egbochuku & Abikwi (2007) investigated the prevalence of ADHD among 406 pupils, aged 5 to 12 years, in 3 public primary schools in Benin City, Edo State through a teacher-rated questionnaire. A prevalence of 23.15% was obtained for ADHD which is unusually high. This might be due to teachers not adequately reporting on each pupil in the class due to high pupil to teacher ratio in Nigerian public schools. Also, this study did not obtain corroborative reports from the children or parents. The importance of corroborative evidence from parents is illustrated by another study from Nigeria by Adewuya & Famuyiwa (2007) who used a two-staged procedure in which primary school pupils aged 6-12 years (n = 1112) were assessed for DSM-IV criteria of ADHD by their teachers in the first stage and their parents in the second stage and found a prevalence of 8.7%. As in previous studies (Ambuabunos et al., 2011), they found the male to female ratio to be 2:1 and higher incidence in the younger age group.

2.5 Modalities of management

The management of ADHD can be pharmacotherapy or by psychosocial intervention. Both pharmacotherapy and psychosocial interventions are considered effective treatment for ADHD and the combination of these treatments considered an ideal approach in many cases.

2.5.1 Pharmacotherapy

This is considered to be the first line of treatment for severe ADHD. There are two broad categories of pharmacologic agents used in the treatment of ADHD namely central nervous system stimulants and non-stimulants.

Central nervous system stimulants are usually the medications of first choice because they have been shown to have the greatest efficacy with generally tolerable mild side effects (Sadock & Sadock, 2007). Examples of medications in this category include methylphenidate, dextroamphetamine and dextroamphetamine/amphetamine salt combinations. While stimulants are usually the first choice medications for ADHD, they are not for everyone. Sustained central nervous system stimulants medication treatments are associated with side effects such as growth suppression (Sadock & Sadock, 2007). In some patients, these medications are ineffective while they cause intolerable side effects in some others such as decreased appetite, insomnia, irritability and tics.

Non-stimulant medications are the second line medications for patients with ADHD who did not tolerate or respond to stimulant medications. The classes of medications in this category include norepinephrine reuptake inhibitor (Atomoxetine), antidepressants (imipramine) and the alpha-

adrenergic receptor agonists (clonidine and guanfacine). However, apart from Atomoxetine, these classes of medications are less effective and may have less favourable side effects profile.

Although pharmacotherapy is considered the first line of treatment for ADHD, it is often insufficient for the comprehensive management of children with ADHD. Thus, psychosocial interventions are very important additions in the management of ADHD.

2.5.2 Psychosocial interventions

Psychosocial interventions are of importance for a number of reasons. Firstly, there have been questions about the long-term effectiveness of stimulants into adolescence and beyond (Swanson et al., 1993). Similarly, some studies have indicated that many of the effects of medications may only last for as long as the person is receiving medication and may not generalise to situations where treatment is absent i.e. state-dependent (Whalen & Henker, 1991). Secondly, children with ADHD typically have secondary problems such as low self-esteem, poor peer relationships and poor academic performance or learning which may not be improved by medications alone (Swanson et al., 1993). Also, families of children with ADHD tend to be dysfunctional in multiple domains with problems such as maternal stress, paternal alcohol misuse and poor parenting skills (Pelham & Gnagy, 1999) which cannot be addressed with medications.

In addition, a significant number of children with ADHD do not respond to medications (Swanson et al., 1995) while in those who respond, the medications may not necessarily bring them within clinically normal range (Pelham & Murphy, 1986). Furthermore, some children may develop intolerable side effects to medication which may be severe enough to interfere with medication adherence or even lead to treatment discontinuation. Schachar et al., (1997) found that 15% of children treated with methylphenidate discontinued treatment at 4 months because of

side effects while 4% of the 289 children randomized to medication in the MTA study discontinued medication on account of severe adverse effects (MTA Cooperative Group, 1999). Additionally, ADHD may present in children below the age of 6 years. Dexamphetamine is the only medication approved in UK for the treatment of ADHD in children 3 years and older. Thus psychosocial interventions may be of particular benefit in this group of patients. Also, some group of parents, carers and professionals have aversion to the use of any type of psychotropic medication in children, concerns about their possible side effects and long-term sequelea and an unease that the focus of treatment should be solely on the child instead of the interface between them and the social and educational systems of which they are a part (Perring, 1997).

The Multimodal Treatment Study of Children with ADHD (MTA Cooperative Group, 1999), the largest ADHD treatment study ever conducted, found that medication management was superior to behavioural treatment and to routine community care that included medication. Combination of medication management and behavioural therapy did not yield significantly greater benefits for core ADHD symptoms than medication management alone either. Importantly though, combined treatment was more effective for non-ADHD symptoms (such as oppositional/aggressive symptoms and internalizing symptoms) and positive functioning outcomes (such as teacher-rated social skills and parent-child relations) (MTA Cooperative Group, 1999) which are important areas of deficits in children with ADHD. Additionally, studies have found that combination of medication management and behavioural therapy reduces the dose of medications required to attain effective symptom reductions (Pelham et al., 2014). This is of benefit because lower doses of medication may reduce growth suppression effects, be associated with reduced side effects overall and be more acceptable to families who have

concerns about medicating their children. Pelham et al. (2014), in their study of 48 children with ADHD aged 5 - 12 years old, found that on virtually all the measures studied, adding high intensity behaviour management to the lowest dose of medication yielded comparable improvements to those produced by high dose medication alone. For some measures, even low intensity behavioural management combined with the lowest medication dose was as effective as high dose medication.

Psychosocial interventions for children with ADHD include a range of cognitive behavioural approaches, behavioural interventions, parent training, cognitive training and social skills training(National Collaborating Centre for Mental Health, 2009). Other therapies for ADHD have also been researched such as biofeedback training, relaxation training, environmental manipulation and management. The three main ones used for children with ADHD are cognitive behavioural therapy (CBT), social skills training and family therapy(National Collaborating Centre for Mental Health, 2009). The choice of psychosocial interventions is influenced by the age of the child. For younger children with ADHD (up to 6 years), behavioural approaches primarily parent-training interventions are the main focus of research. For older children, the approaches include CBT, social skills training and self-instructional training coupled with parent-training(National Collaborating Centre for Mental Health, 2009).

Cognitive behaviour therapy (CBT): this is a psychotherapy that is comprised of two therapies namely behavioural therapy and cognitive therapy. CBT approaches that are relevant to the treatment of children with ADHD include behavioural therapy, cognitive therapy and parent

training. CBT techniques have been extensively used with the aim of helping to improve motor behaviour, inattention and impulsivity.

Cognitive therapy:

This helps the young person develop a more planned and reflective way of thinking and behaving by learning how to adopt a more reflective, systematic and goal-directed approach to tasks and problem solving. Commonly used cognitive therapeutic approaches in the psychological treatment of ADHD include self-instructional training (such as cognitive modelling, self-evaluation, self-reinforcement and response cost), step-by-step approaches, physical cues and reminders.

Behaviour therapy:

The chief technique involves the use of rewards or reinforcers that are judged likely to encourage the young person to implement targeted changes in motor, impulse or attentional control. A second set of techniques involves negative consequences (such as verbal reprimands and response cost technique) which are used usually where a particular behaviour is disruptive or offensive to others and needs to be stopped immediately such as impulsive behaviour. The third technique is 'time out' (short for 'time out from social reinforcement'), which involves the young person being placed away from the attention of others for a set period during which time they are expected to be quiet and co-operative, otherwise the procedure is implemented again. This particular approach is helpful where it is felt that inappropriate, overactive or impulsive behaviour is being maintained by the attention of others such as parents, siblings or peers.

2.6 The role of teachers

Teachers have vital roles to play in the management of children with ADHD. Children spend the majority of their time in classrooms and other school settings in which they are expected to comply with rules, behave in a socially desirable manner, take part in educational activities and refrain from disrupting the learning or activities of other students who share their educational environment (Kleynhans, 2005). Also, the increasing adoption of inclusive education approach for all children means that the majority of children with ADHD are currently educated in mainstream classrooms (Mitchell, 2010).

Teachers are thus one of the most suitable groups of people to receive information as well as training on the management of ADHD. Researchers suggested that primary school teachers should have training on ADHD for several reasons. Firstly, they are one of the most important agents of socialisation during childhood and adolescence thus placing them in a uniquely advantageous position for detecting possible cases of ADHD. This could be because concerns about ADHD usually first appear during the early years of formal schooling probably because of the disruptive behaviour in the classrooms (Tannock & Martinussen, 2001). The classroom environment typically requires that students behave in ways that are incompatible with the ADHD defining symptoms (Kos, Richdale, & Hay, 2006).

Secondly, ADHD is one of the most common neuro-developmental disorders among children with at least one child with ADHD in each classroom of 25 pupils (Fabiano & Pelham, 2003) (Kos et al., 2006). This makes the reduction of the associated classroom impairments an area of concern for all educational staff. In the developing countries where the number of classes are

often up to 50 pupils with only two teachers (a ratio of 25 to 1), the associated classroom disruptions could be phenomenal. Children with ADHD necessitate greater amounts of attention than their classmates, a succession of organizational and structural modifications and greater contribution by teachers (Soroa, Gorostiaga, & Nekane, 2013). Thirdly, teachers play an essential role in establishing the diagnosis of ADHD. The Diagnostic Statistical Manual, 5th edition (DSM-V) requires that the symptoms of ADHD are present in two or more settings such as the home, school or work, with friends or relatives or in other activities (American Psychiatric Association., 2013). As children spend the majority of their time in schools (Kleynhans, 2005) and interact with teachers in a variety of ways on a daily basis (Pelham et al., 1992) practitioners rely on teachers to provide information to assist in establishing diagnosis. Carey (1999) found that more than half of the 401 paediatricians studied relied solely on information from school reports to diagnose ADHD.

In addition, teachers are essential in the implementation, support and evaluation of recommended treatment plan for children with ADHD (Ohan et al., 2008). Also, teachers make recommendations, appropriate or inappropriate, about ADHD to the parents, who tend to follow such recommendations (Ohan et al., 2008) (Kos et al., 2006). In turn, parents frequently turn to teachers for information about ADHD (Bussing, Schoenberg, & Perwien, 1998). Di Battista & Sheperd (1993) found that teachers provided incorrect and unsuitable advice to parents of children with ADHD which many of them followed (Di Battista & Sheperd, 1993).

The knowledge that teachers have about ADHD affects their behaviour and attitudes towards affected children. Teachers with more knowledge about ADHD have a more favourable conduct and attitudes (Kos et al., 2006).

2.6.1 Teachers and ADHD training

Previous researches have focused on investigating teachers' knowledge of and attitude towards children with ADHD. The findings of these studies revealed that teachers had low knowledge level. The authors recommended that future studies should focus on training teachers and assessing the impact of such training with the target of increasing teachers' knowledge about ADHD. Guerra & Brown (2012) examined the level of knowledge of ADHD among 107 middle school teachers in South Texas using the Knowledge of Attention Deficit Disorders Scale (KADDS). The teachers were from 5 middle schools in three school districts and their general knowledge score was a mean score of 46.49% (SD=17.39).

Ghanizadeh et al. (2006) studied the knowledge of and attitude towards ADHD among elementary school teachers in Shiraz, Iran. These teachers completed a self-report questionnaire. The authors reported the knowledge level as well as the attitude score as low. Similarly, Bradshaw & Kamal (2013) explored the knowledge and perception of ADHD among 232 teachers teaching students in grade 1 to 12 in 12 randomly selected schools in greater Doha, Qatar. They used KADDS and found that although 54.5% of the teachers stated that they had taught a student a student with ADHD, only 31% of them answered correctly to the KADDS item. Also teachers' rating about perceptions illustrated the need for increased development of teachers with regards to ADHD.

Also, 72 teachers from 7 schools in one school district in southwest Florida filled sociodemographic questionnaires, KADDS as well as the Teacher Intervention Survey in a study conducted to determine their knowledge, training, and ratings of acceptability of interventions

(Small, 2003). The Teacher Intervention Survey assessed the teachers' perceived familiarity with interventions commonly recommended for use with students with ADHD. The results revealed that the teachers had a limited knowledge of ADHD, scoring an average of 57% on the KADDS questionnaire. They felt more knowledgeable about and rated lower barriers to implementation of instructional management interventions such as use of cues, prompts, and attention checks; physical arrangement; structure; and varied presentation and format of materials. They felt they knew least about and had more barriers to the implementation of behavior management interventions such as token economy, response cost, and time-out from positive reinforcement, as well as self-management techniques.

In a thesis presented by Dilaimi (2013) in partial fulfilment of the requirements for the degree of Master in Educational Psychology, 84 general education and special education primary school teachers in Albany, New Zealand completed a postal survey. The survey instruments comprised of demographic questionnaire and the KADDS. He found that teachers answered an average of 35% of questions correctly on the KADDS and the majority of respondents did not learn about ADHD during their teacher training (80%). He concluded that New Zealand primary school teachers did not have the level of knowledge about the disorder required to effectively participate in the referral, diagnosis, treatment, or monitoring of students with ADHD.

One of the few studies examining the impact of training on the level of knowledge of ADHD among teachers was a study by Sarraf et al. (2011) of 67 primary school teachers in Isfahan, Iran. The authors compared the effect of nonattendance education method with workshop education method on teachers' knowledge, attitude, and function towards students with ADHD. The

workshop education group had two days of education while the nonattendance education group was given related booklets to study with the precise educational content similar to that of the workshop education group. Post-test questionnaires were given to the workshop group after the two days of education while they were given to the nonattendance group who had studied the related booklets after ten days. They found that both nonattendance education method and workshop education method were effective in promoting teachers' knowledge but workshop education was more effective in attitude change and promotion of teachers' knowledge of function about dealing with ADHD students. However, the study lacked a control group that did not receive any training and it did not assess the teachers' knowledge on classroom management strategies of ADHD. It was a comparative study though.

Murray (2009) examined teachers' and parents' knowledge of and attitudes toward children with ADHD and, in turn, used this base of evidence to develop and evaluate a pilot ADHD intervention program for pre-service teachers in Murdoch, Western Australia. There were 71 teachers and 67 parents. The instruments used were Self-report ADHD questionnaires for teachers and Self-report ADHD questionnaires for parents. Part two consisted of the training of pre-service teachers using the pilot ADHD intervention program designed by the author in a three-hour program (equivalent to the time allocated for a lecture and tutorial in that setting). Post-intervention Self-report ADHD questionnaires for teachers were then administered to the pre-service teachers 3 weeks after the intervention. The teachers were most knowledgeable about the characteristics of ADHD (67.7%) and least knowledgeable about the causes (42.4%). Pre-service teachers showed a significant improvement in their knowledge scores post-intervention.

Syed (2010) studied the impact of a two-hour per day, week-long teachers' training program on their knowledge of ADHD across three schools in various areas of Karachi, Pakistani. Forty-nine female teachers participated in the study and the training program for ADHD designed by the authors. They filled a sociodemographic and an ADHD knowledge questionnaire before and after the training. Mean scores on the teachers' knowledge questionnaires pre and post intervention were compared using paired t-test. He found that the training improved the knowledge of the school teachers about ADHD and this remained significant at 6 months post-training.

Of even more concern is the dearth of such studies in Nigeria where this present study was conducted. The literature search revealed a cross-sectional study carried out in Southwest Nigeria and a dearth of study assessing teachers' knowledge of and attitude towards ADHD as well as impact of training on the level of knowledge of primary school teachers in northern Nigeria where this was conducted.

Adeosun et al. (2013) examined one hundred and forty-four primary school teachers (144) from four mainstream schools in Lagos State, Nigeria. These teachers were presented with vignettes describing school children with ADHD after which they completed questionnaires which elicited their knowledge of ADHD and attitudes towards children with the disorder. They found a high level of misperception about ADHD as well as negative attitudes towards children with the disorder. For instance, only 16.7% of the respondents agreed that ADHD could be managed with psychological interventions while 25.7% affirmed that they would avoid relating with a child with ADHD and as high as 35.4% would be unwilling to accept a student with ADHD in their class. Although this study sampled teachers from four schools and utilized a relatively large

sample, it was not an intervention study. Furthermore, it was conducted in the southwest of the country while the present study was conducted in the northern part of Nigeria and included training of teachers with post intervention assessment of the impact of the training.

CHAPTER THREE

METHODOLOGY

3.1 Study area

The study was carried out among primary school teachers in Kaduna state. Kaduna is the capital of Kaduna State and it is situated in the north-west geopolitical zone of Nigeria. Kaduna was also the headquarters of the former northern region of Nigeria until the creation of the twelve states in 1967. In February 1976, Kaduna state was created by the then Murtala Mohammed regime out of the old northern region. Katsina state was created out of Kaduna state in the state creation exercise of 1987. Kaduna is one of the most cosmopolitan cities in Nigeria and has sizeable proportions of every major ethnic group. Kaduna state is divided into 23 local government areas although the metropolis is made up of four local government areas namely Kaduna North, Kaduna South, Igabi and Chikun local government areas.

There are 1,512 public primary schools with pre-primary classes with a population base of 848,226; 2,614 public primary schools without pre-primary classes with a population base of 497,509 and 1006 private pre-primary/primary schools in Kaduna state of which primary only are 39 schools with a population base of 230,296 (Ministry of Education, 2010). The population base of the teachers in public primary schools in Kaduna metropolis is 36,492 and 19,283 in the private schools.

3.2 Study design

This study is a quasi experimental study with an intervention group and a waiting list control group.

3.3 Study population

The study population comprised of primary school teachers in public and private schools in Kaduna state.

3.3.1 Inclusion criteria

1. Primary school teachers in the selected schools who consented to participate

3.3.2 Exclusion criteria

1. Teachers who did not give consent to participate

3.4 Sample size

The sample size for the study was calculated using the formula for comparing two means:

$n = 2F(\sigma/d)^2$ (Wade, 1997)

where

n = The sample for one of the two groups

F = 7.85 based on power of 80% and 0.05% level of significance

σ = The standard deviation for the outcome measure which is taken as 1

d = The difference we expect to be found between the treatment and control groups. We are assuming that the training will result in the treatment group having a half standard deviation

(0.5) better knowledge of the intervention content than the control group then, the sample size will be

$n = 2F(\sigma/d)^2$

$n = 2x\ 7.85(1/0.5)^2$

$n = 62.8 \approx 63$

This means 63 teachers in the control group and 63 teachers in the intervention group.

In order to compensate for possible non-response, an adjustment was made to the calculated sample size, using the formula (Araoye, 2003).

$$n_s = \frac{n}{ar}$$

Where:

n_s = The compensated sample size

n = The calculated sample size (63)

ar = Anticipated response rate, set at 90%.

Thus, $n_s = \frac{63}{0.9}$

$= 70$

Thus, 70 teachers were sampled for the intervention group and 70 teachers for the control group. However, because of the method of picking at least one teacher from each class in the selected schools by balloting, so as not to leave the classes unattended to, the teachers that eventually participated were 84 in the intervention group and 75 in the control group.

3.5 Sampling technique

The study was a quasi experimental study and involved 75 teachers in the control group and 84 teachers in the intervention group from two local government areas in Kaduna state. The teachers in the intervention group were selected from primary schools in a local government area different from that of the control group in order to avoid contamination.

The teachers were selected by stratified random sampling technique. The local government areas in Kaduna metropolis were listed in alphabetical order and this constituted the sampling frame for the local government areas. In stage one, using the random sampling technique with the list of local government areas as the sampling frame, Kaduna South and Chikun local government areas were randomly selected by table of random numbers (TORN). In stage two, one of the two local government areas was randomly assigned to a control group (Chikun) and the other local government area (Kaduna South) to an intervention group by balloting.

In stage three, the schools in each of the two local government areas were stratified into public schools and private schools. These public and private schools in each of the two local government areas were then listed in alphabetical order and numbered. This was then followed by selection of schools in the two local governments using the table of random figures. The number of private and public schools selected was based on probability-proportional-to size (PPS) calculation using the teacher population as the basis.

In stage four, the headmaster of the intervention schools were initially asked to identify teachers in the schools who would like to be trained on ADHD. In order to have at least one teacher to manage each classroom during the training, the head master used balloting to select one teacher if both teachers in the same classroom indicated interest in participating in the training. The teachers selected in this procedure exceeded the sample size but were accommodated in the training to avoid leaving some disappointed. The plan was that if the intervention proved effective (which is now known to be the case), the trained teachers would train the rest later using the intervention manual. Similarly, the head teachers of the control group schools also selected teachers who indicated interest in ADHD training in the future. Similar balloting technique was used to select from those who showed interest until the sample size was reached. For logistical reasons, teachers were trained in their own schools using either a big classroom or the library. The training was conducted from 10 a.m. to 1 p.m. (from the period of first break, after the first morning lessons). The training lasted for 3 hours with a break of 10 minutes after each hour. The training was reinforced with a second session (booster) of 1.5 hours training 2-weeks later.

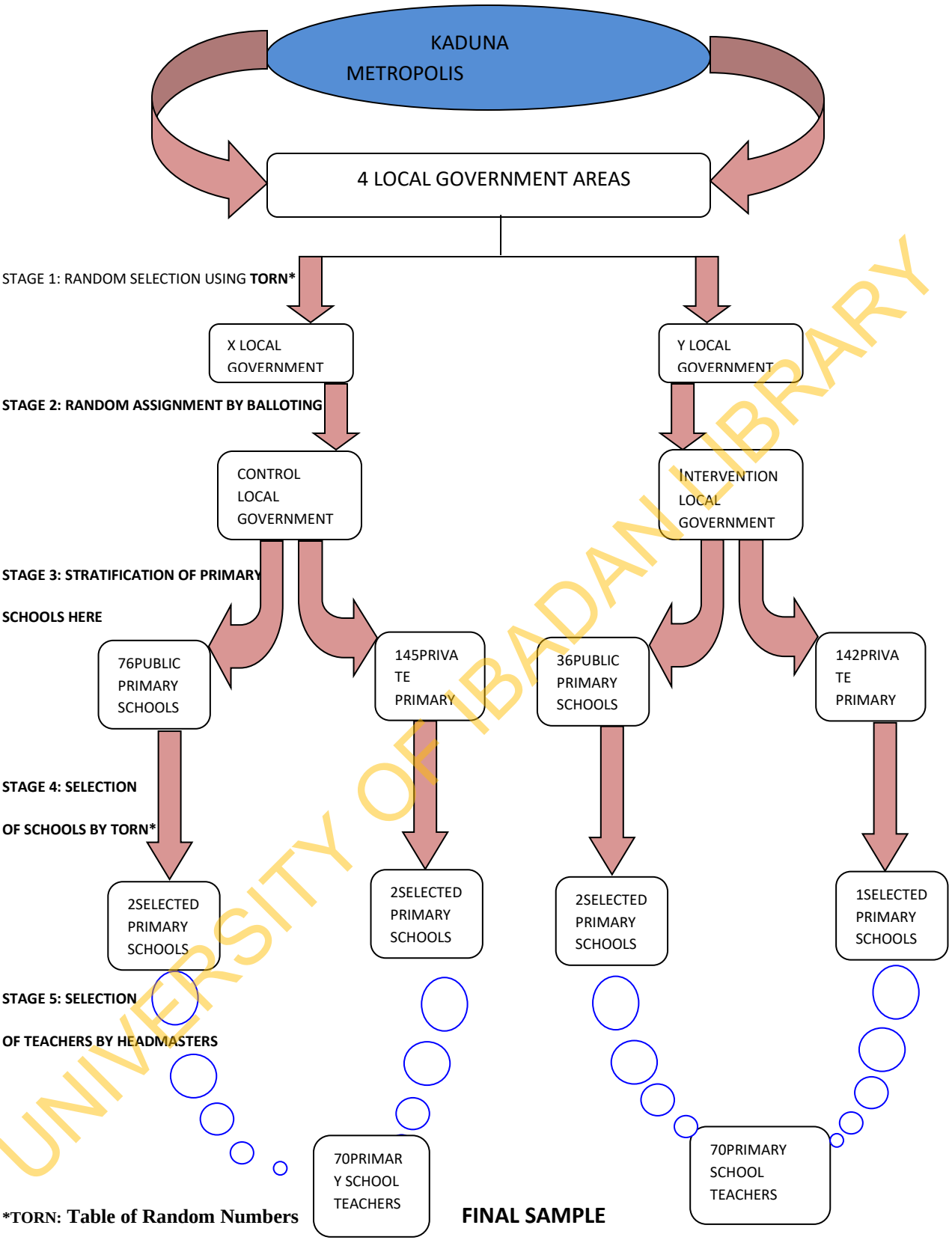

FIGURE 3.1: Flow chart of the sampling technique

3.6 Study Instruments

The following instruments were used for data collection in the study:

1. A Socio demographic Questionnaire
2. Self-report ADHD Questionnaire (Kos, Richdale, & Jackson, 2004)
3. Attention Deficit Hyperactivity Disorder (ADHD) Attitude Questionnaire- 30- Item Attitude Scale (Kos, Richdale, & Jackson, 2004)
4. Knowledge of Behavioural Interventions Questionnaire (Ani, 2014)
5. Client Satisfaction Questionnaire

3.6.1 Socio demographic Questionnaire (Appendix I)

This instrument obtained information about the teachers' age, gender, previous training on ADHD, teaching experience, qualifications, class being taught, any child with ADHD in the class, ethnicity and religion among others.

3.6.2 Self-report ADHD Knowledge Questionnaire (SRAQ) (Appendix 2)

The Self-report ADHD questionnaire (Kos, 2004) contains 27 items designed to assess teachers' knowledge and misperceptions regarding symptoms/diagnosis of ADHD, the treatment of ADHD, and general information about the nature, causes, and outcome of ADHD. Each item is answered as "True," "False," or "Don't Know" responses indicating knowledge, misperception and lack of knowledge concerning ADHD. The SRAQ was derived from Knowledge of Attention Deficit Disorders Scale (KADDS) (Sciutto, Terjesen, & Bender, 2000) that was to be used in this study. However, the Sciutto et al. (2000) instrument has many more items than the SRAQ and is much more time consuming to complete. Given the quantity of questionnaires that

were required to be completed by the teachers in this study, a pragmatic decision was made to use the shorter version focusing on knowledge of ADHD (SRAQ). This, it was thought may increase the participation rate of teachers by reducing the burden of questionnaires, whilst not compromising the quality of the study. It has good psychometric properties (α = .78 for the knowledge scale). The items were analysed individually and also summed into a Knowledge score where higher scores indicate better knowledge of ADHD.

3.6.3 **ADHD Attitude Scale** (Kos et al., 2004)

This instrument was a part of the Self-report ADHD questionnaire developed in Australia by Kos et al (Kos et al., 2004) to test the perceived and real knowledge of primary school teachers about ADHD. The original SRAQ is made up of 131 items divided into six sections. Section A collects information on socio-demographic aspects of the sample, Section B includes 27 items drawn up to assess respondents real knowledge of ADHD, Section C focuses on identification of teaching strategies used by subjects with pupils with ADHD, Section D assesses teachers' beliefs and attitudes about ADHD and the possibility of having pupils with it in their classes, Section E evaluate the beliefs of teachers about the different strategies for action possible in classes with pupils with ADHD while Section F contains two multiple choice items to which subjects have to respond regarding whether or not they want more training on ADHD and to specify the way they believe to be most appropriate to find out more about ADHD (Soroa et al., 2013).

Section D of the Attention Deficit Hyperactivity Disorder (ADHD) Questionnaire which assesses teachers' beliefs and attitudes about ADHD and the possibility of having pupils with it in their classes was used in this study as a measure of Teachers Attitude towards ADHD. It is a 30-item scale which is scored on a 5-point Likert-type scale (1= Strongly Disagree to 5= Strongly

Agree). Each item was analysed individually and the total summed to create ADHD Attitude Scale. Higher scores indicate more negative attitude.

3.6.4 Knowledge of behavioural interventions questionnaire (KBIQ) (Appendix 4)

This questionnaire was used to assess the knowledge of teachers on basic classroom strategies for ADHD. It was designed by one of the supervisors (Ani, 2014) for the purpose of this study. It was piloted using a sample of 15 teachers in public primary school before it was used in the main study. The pilot study was done to evaluate the appropriateness and practicability of the instruments. No difficulty was encountered in the comprehension of the questions in the KBIQ. Correct responses were scored as 1 while incorrect responses and don't know as 0. The correct answers were summed to create a KBIQ score where higher scores indicated better knowledge.

3.6.5 Client Satisfaction Questionnaire (Appendix 5)

This consisted of 7 quantitative and 4 qualitative questions used to assess satisfaction of the participants in the intervention group with the training programme. Each of the quantitative question was scored on a 5-point Likert-type scale (1= Strongly Disagree to 5= Strongly Agree).

3.7 Study Procedure

The stratified random sampling technique was used to recruit primary school teachers into the study from Kaduna south and Chikun local government areas in Kaduna state.

Stage 1: Selected primary school teachers from the two local government areas were administered the sociodemographic questionnaires, SRAQ, Attitude Scale and KBIQ in the first stage of the study.

Stage 2: Primary school teachers from the intervention local government had ADHD training programme while the primary school teachers from the control local government served as the

waiting list group. The training was conducted from 10 a.m. to 1 p.m. (from the period of first break, after the first morning lessons). The training lasted for 3 hours with a break of 10 minutes after each hour. Refreshments were served at end of the second one hour. For the teachers in the intervention group to retain the new knowledge and use it in practice, the training was reinforced with a second session (booster) of 1.5 hours training 2-weeks later. Refreshments were served at end of the raining. The second training session also gave the author the opportunity to check for any difficulties in using the classroom strategies taught during the first training. The controls did not have any training.

The intervention group then had the post intervention measures 1 week after the first 3 hour session and these comprised of the SRAQ, Attitude Scale, and the KBIQ. The post booster measures (second post intervention measures) were administered to the intervention group 1 week after the second 1.5 hour session and these comprised of the SRAQ, Attitude Scale, the KBIQ and the client satisfaction questionnaire.

Stage 3: Maintenance of improved knowledge and attitude from the ADHD training programme over the medium term will be assessed by a repeat of the relevant outcome measures 3 months after the second 1.5 hour session in the intervention group. The data will be collected after the submission of this thesis, so not feasible to present here.

Stage 4: The waiting list control group would have the intervention administered now that there was evidence that the intervention was effective.

Each of the participating school was coded and each completed questionnaire was also coded to ensure confidentiality.

3.7.1 The Intervention

The intervention comprised of the MhGAP-IG, the behavioural disorders module, which was modified for the training of primary school teachers on the knowledge of ADHD, its recognition and management options. Also, the participants were trained on classroom management strategies for children with ADHD. The training was delivered by the researcher. The mode of delivery was by the use of Microsoft PowerPoint presentations, clinical vignettes, role plays, small group discussions and video presentation. The intervention was a 3-hour presentation with a 10 minutes break after each hour. There were refreshments at the end of the presentations. For the teachers in the intervention group to retain the new knowledge and use it in practice, the training was reinforced with a second session of 1.5 hours training 2-weeks later. The second training session also gave the author the opportunity to check for any difficulties in using the strategies.

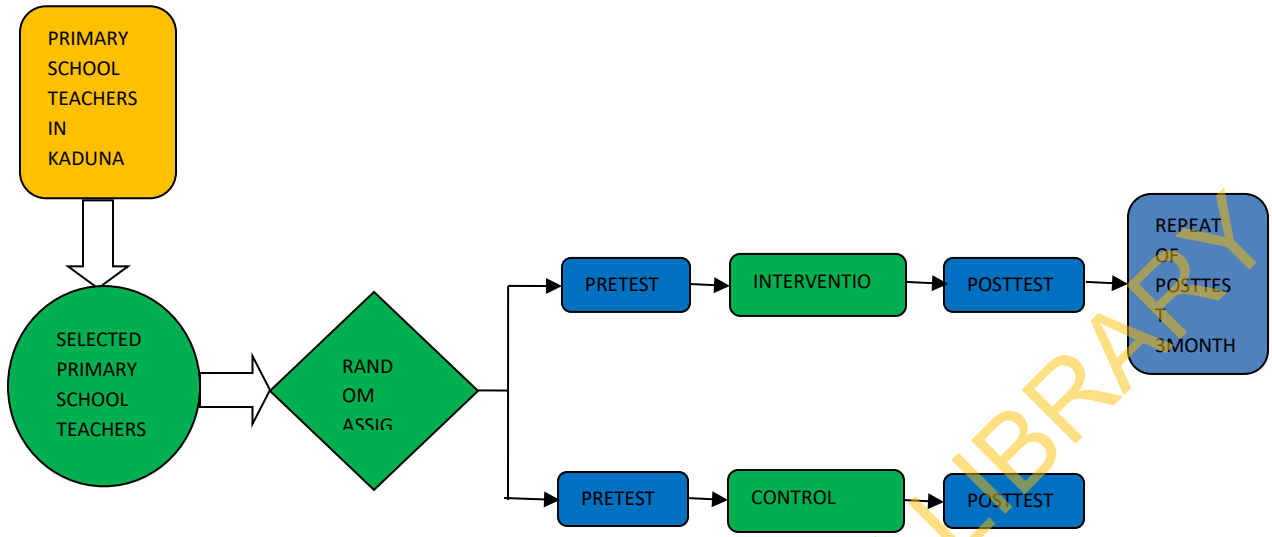

Figure 3.2: Study Procedure

3.8 Ethical considerations

Ethical clearance and approval was obtained from the Research and Ethics Committee of the Federal Neuro – Psychiatric Hospital, Kaduna. Permission was obtained from the Kaduna State Universal Basic Education Board and the head teachers of the participating schools. Written informed consent was also obtained from the participating teachers. The teachers who agreed to participate were assured that confidentiality would be ensured on any information obtained from the participants. The questionnaires were coded and the participants assigned code numbers to ensure matching of the questionnaires at each level of intervention. The lists of names of participants was kept confidential and only the investigator and the research assistant had access to these. The lists were destroyed once the last set of data was collected and coded.

3.9 Data analysis

The data obtained were cleaned and entered into statistical package for social sciences, version 16.0 Software (SPSS 16), which was also used for data analyses. Frequency tables were used for descriptive statistics. Cross tabulations were done and relationships between categorical variables explored with chi square. Proportions of teachers in each group who had knowledge about ADHD as well as the proportion of those who had misperceptions and those who lacked knowledge were assessed using descriptive statistical tools such as the clustered bar charts, frequency tables, and means with standard deviation. Frequencies, means, and standard deviations were also used to summarize socio demographic characteristics.

In order to determine the impact of the intervention, data analyses were done along the following directions:

1. To compare socio-demographic characteristics and scores on outcome measures (Scales) at baseline using independent sample t-tests and correlations for continuous measures.
2. Compare baseline and posttest scores on knowledge of ADHD, attitudes to ADHD, and Knowledge of behavioural intervention among the intervention group using paired sample t-tests
3. Compare baseline and posttest scores on knowledge of ADHD, attitudes to ADHD, and Knowledge of behavioural intervention among the control group using paired sample t test
4. Compare the posttest scores of the intervention group with the post test scores of the control group on knowledge of ADHD, attitudes to ADHD, and Knowledge of behavioural intervention using independent sample t test
5. Treatment effect was determined by Analysis of Covariance (ANCOVA) using post test scores on knowledge of ADHD, attitudes to ADHD, and Knowledge of behavioural intervention as the dependent variable, while controlling for the baseline scores.
6. To determine maintenance of treatment effect, paired t tests will be used to compare the post test scores of the intervention group with their scores after 3 months follow up.

The level of significance was set at $P < 0.05$, two-tailed and 95% confidence interval.

3.10: Sample description and study flow

A total of 159 primary school teachers from four public and three private schools participated in this study. This number is made up of 84 teachers in the intervention group and 75 teachers in the control group. In the intervention group, 84 teachers attended the first training session and completed the study measures, 76 teachers attended the second training session and completed the second study measures but only 75 teachers completed the third study measures. In the control group, 75 teachers filled the baseline measures while only 71 teachers were available for the follow up measures one month after the baseline measures (Figure 3.3).

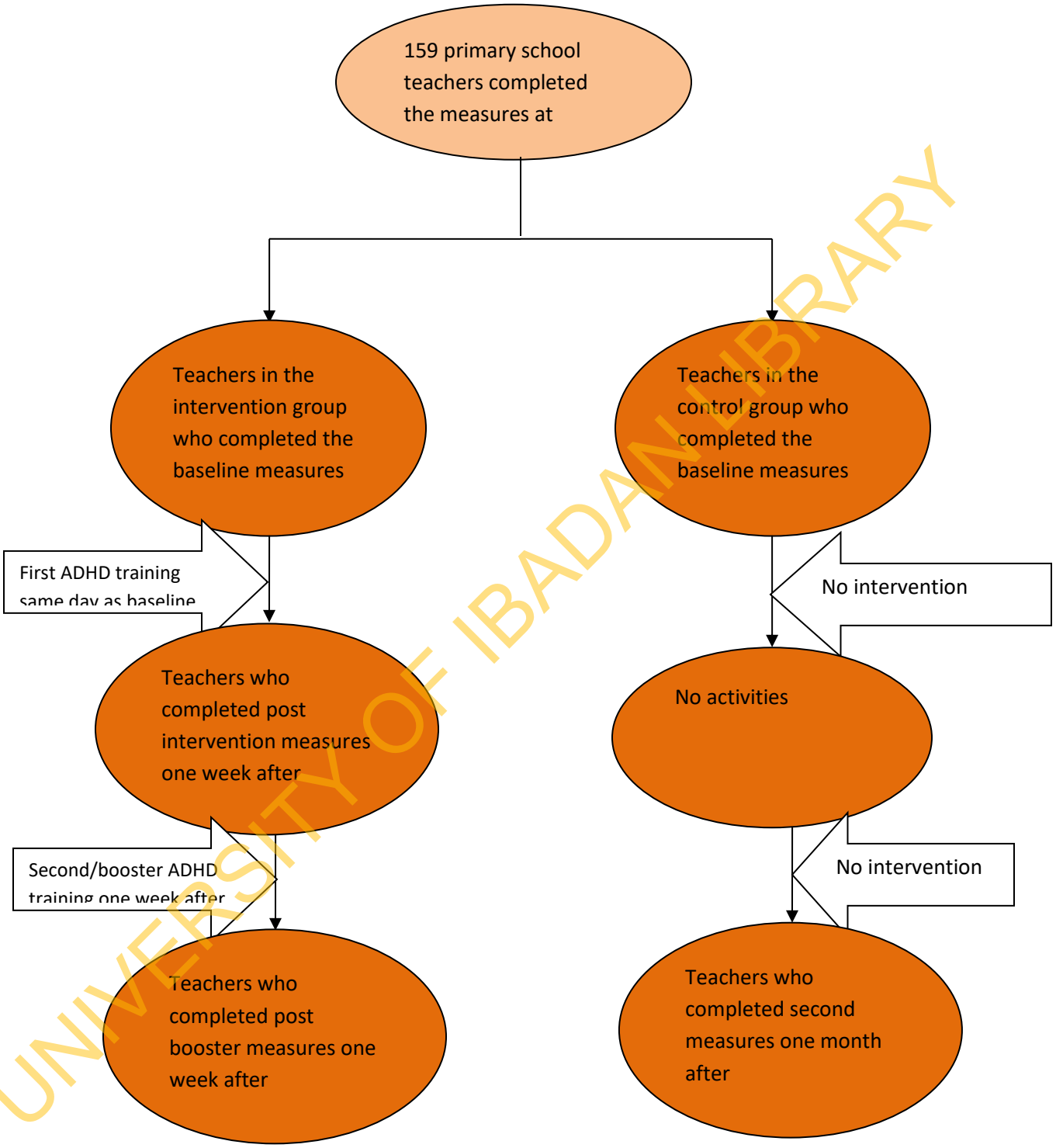

Figure 3.3: Study flow chart

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter is divided into 6 sections. Section one describes the sample. The second section compares the intervention and control groups at baseline and post intervention. The third section compared the intervention group at baseline, post intervention and post booster while the fourth section compared the control group at baseline and post intervention. The fifth section describes the test of treatment effect and the sixth section is on participants' satisfaction with the training programme.

SECTION I

This section describes the sample (Tables 4.1 and 4.2).

Socio-demographic characteristics of participants

The mean age of the teachers was 42.46 ± 8.03 years and they reported an average of 14.30 years (*SD* = 8.13 years) of teaching experience. The sociodemographic characteristics of teachers in the two groups were not statistically different in terms of gender, type of school, qualifications, classes currently taught, having additional training on ADHD, ever teaching pupils with ADHD, number of ADHD workshops attended, number of ADHD articles read, whether previous education involved training on ADHD and whether their schools employed people specifically to help pupils with ADHD. There was a statistically significant difference in ever requested for ADHD evaluation for a pupil. Teachers in the control group were more likely to have ever requested for ADHD evaluation for pupils ($\chi^2 = 5.9$, $p < 0.02$) (Table 4.1).

Table 4.1: Comparison of the Sociodemographic characteristics of the two groups (categorical variables)

Variables	Intervention N = 84 n (%)	Control N = 75 n (%)	χ^2	P
Gender				
Male	12 (75.0)	4 (25.0)	3.5	0.06
Female	72 (50.3)	71 (49.7)		
Religion				
Christianity	80 (53.0)	71(47.0)	0.03	0.87
Islam	4 (50.0)	4(50.0)		
Ethnicity				
Hausa	47 (43.5)	61 (56.5)	12.3	**0.002**[BS*]
Ibo	26 (76.5)	8 (23.5)		
Yoruba	11 (64.7)	6 (35.3)		
Type of School Public				
Private	58 (52.3)	53 (47.7)	0.05	0.82
Government	26 (54.2)	22 (45.8)		
Qualifications				
NCE	57 (52.8)	51 (47.2)	1.5	0.82
Degree	20 (50.0))	20 (50.0)		
PGD	2 (50.0)	2 (50.0)		
Grade 2	1 (100.0)	-		
Marks	4 (66.7)	2 (33.3)		
Class currently taught				
Nursery	10 (50.0)	10 (50.0)	1.0	0.60
Pry 1-3	36 (49.3)	37 (50.7)		
Pry 4-6	38 (57.6)	28 (42.4)		
Previous Education involving ADHD				
Yes	17 (39.5)	26 (60.5)	3.16	0.08[Y]
No	65 (57.8)	49 (42.2)		
Additional Training on ADHD				
Yes	14 (58.3)	10 (41.7)		
No	70 (51.9)	65 (48.1)	0.3	0.56
Ever taught pupil with ADHD				
Yes	48 (49.5)	47 (50.5)		
No	38 (57.6)	28 (42.4)	1.0	0.31
Ever requested ADHD evaluation				
Yes	5 (25.0)	15 (75.0)	5.9	**< 0.02**[Y]
No	79 (56.8)	60 (43.2)		
Does your school employ helpers for pupils with ADHD				
Yes	4 (30.8)	6 (69.2)	2.8	0.10
No	80 (54.8)	66 (45.2)		

BS: Bonferonni Significant: Y: Yates Corrected

There were statistically significant differences in the age, years of teaching experiences, number of pupils in the class and number of pupils with ADHD ever taught in the past. Teachers in the control group were significantly more likely to be younger ($t = 4.10$, $p < 0.001$), to have fewer years of teaching experience ($t = 2.19$, $p = 0.03$), have larger number of pupils in the class ($t = -3.40$, $p < 0.001$), and to have taught more pupils with ADHD in the past ($t = -2.12$, $p < 0.04$), (Table 4.2).

Table 4.2: Comparison of the Sociodemographic characteristics of the two groups (continuous variables)

Continuous variables	Intervention group N = 84 Mean (SD)	Control group N = 75 Mean (SD)	t	df	P
Age	44.81 (9.64)	39.83 (7.68)	4.10	157	**< 0.001***
No of years teaching	15.62 (8.48)	12.83 (7.49)	2.19	157	**0.03***
No of Pupils in the class	30.68 (8.78)	44.44 (21.54)	-3.40	157	**< 0.001***
No of workshops attended on ADHD	0.14 (0.58)	0.19 (0.51)	-0.50	157	0.62
Hours of ADHD Training had before	0.63 (1.40)	1.03 (2.09)	1.42	157	0.16
No of articles read on ADHD	0.48 (1.92)	0.41(1.30)	0.24	157	0.81
No of Students with ADHD ever taught in the past	2.90 (6.51)	6.43 (13.62)	-2.12	157	**< 0.04***

*** Significant at p<0.05**

SECTION II

This section compares the intervention and control groups at baseline (Tables 4.3, 4.4a, 4.4b, 4.5a, 4.5b, 4.6a, 4.6b and post intervention (Tables 4.7, 4.8a, 4.8b, 4.9a, 4.9b, 4.10a, 4.10b and Figures 4.2 and 4.3.

There was no statistically significant difference in baseline scores on knowledge of ADHD and Attitude scales. However, the intervention group scored significantly higher on knowledge of behavioural intervention **(t = 2.84, p = 0.01)** (Table 4.3).

Table 4.3: Differences in baseline scores on the knowledge, behavioural and attitude items between the intervention group and control group

Continuous variables	**Intervention N = 84 Mean (SD)**	**Control n = 75 Mean (SD)**	**t**	**df**	**P**
Knowledge of ADHD score	11.04 (4.07)	10.72 (4.30)	0.48	157	0.65
Attitude towards ADHD score	92.92(10.28)	93.49 (7.98)	-0.39	157	0.70
Knowledge of Behavioural intervention	7.40 (2.79)	6.29 (2.85)	2.84	157	**0.01***

*** Significant at p<0.05**

There were significant differences in 4 items of the Knowledge questionnaire between the intervention group and the controls. The intervention group scored better in two questions. The teachers in the intervention group knew that children with ADHD are born with biological vulnerabilities towards inattention and poor self control (χ^2= 6.34, p = 0.01) and that these children cannot be diagnosed in the doctor's office most of the time (χ^2= 4.73, p = 0.03). The control group scored better in 2 questions: They knew that a child who is not over-active but fails to pay attention may have ADHD (χ^2= 4.34, p = 0.04) and approximately 5% of Nigerian school-aged children have ADHD (χ^2= 4.81, p = 0.03) (Table 4.4a).

Table 4.4a: Comparison of correctness of responses on Knowledge items between the intervention group and the control group at baseline

Description	Intervention N = 84 n (%)	Control N = 75 n (%)	χ^2	P
There are a greater number of boys than girls with ADHD				
Correct	32 (50.0)	35 (50.0)	0.40	0.53
Incorrect/don't know	49 (55.1)	40 (44.9)		
There is approximately 1 child in every classroom with a diagnosis of ADHD				
Correct	42 (52.5)	38 (47.5)	0.01	0.93
Incorrect/don't know	42 (53.2)	37 (46.8)		
If medication is prescribed, educational interventions are often unnecessary				
Correct	39 (48.8)	41 (51.2)	1.08	0.30
Incorrect/don't know	45 (57.0)	34 (43.0)		
Children with ADHD are born with biological vulnerabilities towards inattention and poor self control				
Correct	47 (64.4)	26 (35.6)	6.43[Y]	**0.01***
Incorrect/don't know	37 (43.0)	49 (57.0)		
If a child responds to stimulant medication (e.g., Ritalin) then they probably have ADHD				
Correct	19 (61.3)	12 (38.7)	1.11	0.29
Incorrect/don't know	65 (50.8)	63 (49.2)		
A child who is not over-active, but fails to pay attention, may have ADHD				
Correct	29 (42.6)	39 (57.4)	4.34 [Y]	**0.04***
Incorrect/don't know	55 (60.4)	36 (39.6)		
ADHD is often caused by food additives				
Correct	45 (53.6)	39 (46.4)	0.039	0.84
Incorrect/don't know	39 (52.0)	36 (48.0)		
ADHD can be diagnosed in the doctor's office most of the time				
Correct	27 (69.2)	12 (30.8)	4.73[Y]	**0.03***
Incorrect/don't know	57 (47.5)	63 (52.5)		
Children with ADHD always need a quiet environment to concentrate				
Correct	25 (73.5)	9 (26.5)	0.04	0.84
Incorrect/don't know	59 (47.2)	56 (52.8)		
Approximately 5% of Nigerian school-aged children have ADHD				
Correct	19 (38.8)	30 (61.2)	4.81 [Y]	**0.03***
Incorrect/don't know	65 (59.1)	45 (40.9)		
Children with ADHD are usually from single parent families				
Correct	42 (54.5)	35 (45.5)	0.18	0.68
Incorrect/don't know	42 (51.2)	40 (48.8)		

Y:Yates Corrected

*** Significant at p<0.05**

Table 4.4b shows the responses of the participants to other items of the Knowledge questionnaire and there were no significant differences in these other items between the two groups.

Table 4.4b: Comparison of correctness of responses on Knowledge items between the intervention group and the control group at baseline (Contd)

Description	Intervention N = 84 n (%)	Control N = 75 n (%)	χ^2	P
Diets are usually not helpful in treating most children with ADHD				
Correct	27 (61.4)	17 (38.6)	1.78	0.18
Incorrect/don't know	57 (49.6)	58 (50.4)		
ADHD can be inherited				
Correct	54 (56.8)	41 (43.2)	1.52	0.22
Incorrect/don't know	30 (46.9)	34 (53.1)		
Medication is a cure for ADHD				
Correct	29 (52.7)	26 (47.3)	0.00	0.99
Incorrect/don't know	55 (52.9)	49 (47.1)		
All children with ADHD are over-active				
Correct	29 (56.9)	22 (43.1)	0.49	0.48
Incorrect/don't know	55 (50.9)	53 (49.1)		
There are subtypes of ADHD				
Correct	35 (48.6)	37 (51.4)	0.94	0.33
Incorrect/don't know	49 (56.3)	38 (43.7)		
ADHD affects male children only				
Correct	61 (52.6)	55 (47.4)	0.01	0.92
Incorrect/don't know	23 (53.5)	20 (46.5)		
The cause of ADHD is unknown				
Correct	20 (46.5)	23 (53.5)	0.94	0.33
Incorrect/don't know	64 (55.2)	52 (44.8)		
ADHD is the result of poor parenting practices				
Correct	38 (55.1)	31 (44.9)	0.25	0.62
Incorrect/don't know	46 (51.1)	44 (48.9)		
If a child can play Nintendo for hours, than s/he probably doesn't have ADHD				
Correct	19 (44.2)	24 (55.8)	1.77	0.18
Incorrect/don't know	65 (56.0)	51 (44.0)		
Children with ADHD cannot sit still long enough to pay attention				
Correct	70 (56.5)	54 (43.5)	2.97	0.09
Incorrect/don't know	14 (40.0)	21 (60.0)		
ADHD is caused by too much sugar in the diet				
Correct	40 (54.8)	33 (45.2)	0.21	0.65
Incorrect/don't know	44 (51.2)	42 (48.8)		
Family dysfunction may increase the likelihood that a child will be diagnosed with ADHD				
Correct	30 (54.5)	25 (45.5)	0.10	0.75
Incorrect/don't know	54 (51.9)	50 (48.1)		
ADHD can affect both the rich and the poor				
Correct	50 (56.8)	38 (43.2)	1.26	0.26
Incorrect/don't know	34 (47.9)	37 (52.1)		
Children with ADHD usually have good peer relations because of their outgoing nature				
Correct	32 (46.4)	37 (53.6)	2.04	0.15
Incorrect/don't know	52 (57.8)	38 (42.2)		
Research has shown that prolonged use of stimulant medications leads to increased addiction (i.e., drug, alcohol) in adulthood				
Correct	12 (48.0)	13 (52.0)	0.28	0.60
Incorrect/don't know	72 (53.7)	62 (46.3)		
Children with ADHD generally display an inflexible adherence to specific routines and rituals				
Correct	12 (50.0)	12 (50.0)	0.09	0.76
Incorrect/don't know	72 (53.3)	63 (46.7)		

The mean scores of the two groups differed significantly on 3 items at baseline on the attitude items. The controls had better attitude on an item ('ADHD is a legitimate educational problem') ($t = 2.65$, $p = 0.01$) while the intervention group had better attitude on 2 items {'I would feel frustrated having to teach a child with ADHD' ($t = -2.16$, $p = 0.03$) and 'other students do not learn as well as they should when there is a child with ADHD in the class' ($t = -2.77$, $p < 0.01$) } (Table 4.5a).

TABLE 4.5a: Comparison of teachers' attitude scores (*M + SD*) at baseline in the intervention and the control group

Items	**Intervention group n = 84**	**Control group n = 75**	**t**	**df**	**p**
ADHD is a valid diagnosis	3.04 (±1.28)	2.81 (±1.16)	1.14	157	0.26
ADHD is an excuse for children to misbehave	2.50 (±1.20)	2.45 (±1.11)	0.25	157	0.80
ADHD is diagnosed too often	2.74 (±1.05)	2.88 (±0.94)	-0.89	157	0.38
ADHD is a behavioural disorder that should not be treated with medication	2.95 (±1.41)	2.72 (±1.31)	1.07	157	0.28
All children with ADHD should take medication	2.67 (±1.23)	2.73 (±1.20)	-0.35	157	0.73
Medications such as Ritalin and Dexamphetamine should only be used as a last resort	3.28 (±1.14)	3.08 (±1.05)	1.10	157	0.27
ADHD is a legitimate educational problem	3.05 (±1.32)	2.53 (±1.11)	2.65	157	**0.01***
Having a child with ADHD in my class would disrupt my teaching	3.24 (±1.33)	3.37 (±1.25)	-0.66	157	0.51
I would feel frustrated having to teach a child with ADHD	2.81 (±1.32)	3.25 (±1.26)	-2.16	157	**0.03***
Young children with ADHD should be treated more leniently than older children with ADHD	3.38 (±1.29)	3.56 (±1.31)	-0.86	157	0.39
Children with ADHD should be taught by special education teachers	3.40 (±1.33)	3.77 (±1.25)	-1.80	157	0.07
I would prefer to teach a student who was over-active than one who was inattentive	2.81 (±1.23)	3.05 (±1.24)	-1.25	157	0.22
Most students with ADHD do not really disrupt classes that much	3.69 (±1.02)	3.63 (±1.14)	0.37	157	0.71
Children with ADHD should not be taught in the regular school system	2.76 (±1.30)	3.04 (±1.33)	-1.34	157	0.18
The extra time teachers spend with students with ADHD is at the expense of students without ADHD	3.43 (±1.24)	3.68 (±1.12)	-1.34	157	0.18
Other students do not learn as well as they should when there is a child with ADHD in the class	3.06 (±1.41)	3.63 (±1.14)	-2.77	157	**<0.01***
You cannot expect as much from a child with ADHD as you can from other children	3.44 (±1.23)	3.55 (±1.23)	-0.54	157	0.59
Children with ADHD could control their behaviour if they really wanted to	3.38 (±1.07)	3.25 (±1.26)	0.69	157	0.49
Children with ADHD misbehave because they are naughty	2.81 (±1.30)	2.69 (±1.14)	0.60	157	0.55
Children with ADHD cannot change the way they behave	2.51 (±1.21)	2.75 (±1.39)	-1.14	157	0.26
Students with ADHD could do better if only they'd try harder	3.51 (±1.21)	3.65 (±1.16)	-0.75	157	0.45

Higher scores indicate more negative attitude

***Significant at p<0.05**

On Table 4.5b, the mean scores of both groups on the attitude items of the questionnaire differed significantly on 2 items at baseline and the controls had better attitude on these {'Students with ADHD are just as difficult to manage in the classroom as any student' ($t = 2.58$, $p < 0.03$) and 'I have the ability to effectively manage students with ADHD ($t = 2.04$, $p = 0.04$)}.

Table 4.5b: Comparison of teachers' attitude scores (*M* + *SD*) at baseline in the intervention and the control group (Contd)

Items	**Intervention group n = 84**	**Control group n = 75**	**t**	**df**	**p**
Children with ADHD misbehave because they don't like following rules	2.68 (±1.03)	2.93 (±1.25)	-1.41	157	0.16
Students with ADHD are just as difficult to manage in the classroom as any student	3.21 (±1.28)	2.77 (±1.17)	2.58	157	**<0.03***
Managing the behaviour of students with ADHD is easy	3.62 (±1.10)	3.73 (±1.11)	-0.65	157	0.52
I have the skills to deal with children with ADHD in my class	3.32 (±1.07)	3.08 (±1.06)	1.43	157	0.16
I have the ability to effectively manage students with ADHD	3.39 (±1.10)	3.03 (±1.16)	2.04	157	**0.04***
I am limited in the way I manage a child with ADHD	2.99 (±1.11)	3.00 (±0.97)	-0.07	157	0.94
My school has policies that regulate how teachers manage a child with ADHD	3.10 (±1.21)	3.24 (±1.01)	-0.81	157	0.42
Other staff influence how I would manage a child with ADHD	3.23 (±1.12)	3.09 (±0.98)	0.79	157	0.43
Parents of students with ADHD influence how I would manage a child with ADHD	2.96 (±1.23)	2.93 (±1.14)	0.16	157	0.87

Higher scores indicate more negative attitude

Table 4.6 shows that the intervention and control groups differed significantly on 2 questions on the Knowledge of Behavioural Intervention Questionnaire. The intervention group scored better than the control group on these 2 questions {'A child with ADHD is likely to work better when paired to work with one other student than in larger groups of children' ($\chi^2 = 21.20$, $p < 0.001$) and 'Children with ADHD may need extra breaks if a classroom activity requires lengthy periods of sitting' ($\chi^2 = 6.41$, $p = 0.01$)}.

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Table 4.6a: Comparison of correctness of responses on items from the Knowledge of behavioural intervention questionnaire between the intervention group and the control group at baseline

Description	Intervention N = 84 n (%)	Control N = 75 n (%)	χ^2	P
The position where a child with ADHD sits in the classroom does not really affect their behaviour or learning as long as they feel comfortable				
Correct	32 (52.5)	29 (47.5)	0.01	0.94
Incorrect/don't know	52 (53.1)	46 (46.9)		
A child with ADHD is likely to work better when paired to work with one other student than in larger groups of children				
Correct	72 (65.5)	38 (34.5)	21.20 [Y]	<
Incorrect/don't know	12 (24.5)	37 (75.5)		**0.001***
Children with ADHD don't usually have problem with moving from one classroom activity to another activity				
Correct	38 (54.3)	32 (45.7)	0.11	0.74
Incorrect/don't know	46 (51.7)	43 (48.3)		
Children with ADHD may need extra breaks if a classroom activity requires lengthy periods of sitting				
Correct	62 (60.8)	40 (39.2)	6.41 [Y]	**0.01***
Incorrect/don't know	22 (38.6)	35 (61.4)		
Punishing children with ADHD for bad behaviour is more effective in changing their behaviour than rewarding them for good behaviour				
Correct	58 (58.6)	41 (41.4)	3.45	0.06
Incorrect/don't know	26 (43.3)	34 (56.7)		
It is better to delay punishing a child with ADHD for two days after the bad behaviour as this allows the child to think of what they did wrong				
Correct	55 (56.1)	43 (43.9)	1.11	0.29
Incorrect/don't know	29 (47.5)	32 (52.5)		
Ignoring minor misbehavior of a child with ADHD can help to better manage their behaviour in the classroom				
Correct	46 (58.2)	33 (41.8)	1.63	0.20
Incorrect/don't know	38 (48.1)	41 (51.9)		
Children with ADHD need more monitoring during less structured times such as break times				
Correct	59 (56.7)	45 (43.3)	1.84	0.18
Incorrect/don't know	25 (45.5)	30 (54.5)		

Y: Yates Corrected

Table 4.6b shows that there were no other significant differences between the two groups in terms of the other items on the Knowledge of Behavioural Intervention Questionnaire.

Table 4.6b: Comparison of correctness of responses on items from the Knowledge of behavioural intervention questionnaire between the intervention group and the control group at baseline (Contd)

Description	Intervention N = 84 n (%)	Control N = 75 n (%)	χ^2	P
Corporal punishment such as beating a child with stick is the best method for teachers to improve the behaviour of children with ADHD because these children are very difficult to manage				
Correct	62 (53.0)	55 (47.0)	0.01	0.95
Incorrect/don't know	22 (52.4)	20 (47.6)		
Having non-academic programmes such as Physical Education in the morning and having academic subjects such as Mathematics in the afternoon is better for children with ADHD as they are more alert in the afternoon				
Correct	52 (54.2)	44 (45.8)	0.17	0.68
Incorrect/don't know	32 (50.8)	31 (49.2)		
Using colourful and stimulating teaching material is good for other children but not for children with ADHD as it can make them too excited				
Correct	40 (54.1)	34 (45.9)		
Incorrect/don't know	44 (51.8)	41 (48.2)	0.08	0.77
Frequent praise for a child with ADHD is not good for them as they become "big-headed" and start behaving badly				
Correct	46 (54.8)	38 (45.2)		
Incorrect/don't know	38 (50.7)	37 (49.3)	0.27	0.61

The post intervention scores on the outcome measures between the intervention and the control groups showed statistically significant differences in the measures of knowledge of ADHD, attitude towards ADHD and knowledge of behavioural interventions (Table 4.10). The intervention group scored significantly higher on the knowledge of ADHD (t = 5.270, df = 145, p = 0.000), knowledge of behavioural interventions for ADHD (t = 3.594, df = 145, p = 0.005) and significantly less on negative attitude towards ADHD (t = -2.838, df = 145, p = 0.000).

TABLE 4.7: Differences in post intervention scores on the knowledge, behavioural and attitude items between the intervention group and control group

Continuous variables	**Intervention N = 76 Mean (SD)**	**Control n = 71 Mean (SD)**	**t**	**df**	**P**
Knowledge of ADHD Scale	14.74 (±3.25)	11.80 (±3.50)	5.27	145	< **0.001***
Attitude to ADHD Scale	91.88(±8.10)	95.97 (±9.37)	-2.84	145	< **0.001***
Knowledge of Behavioural intervention Scale	8.37 (±2.12)	7.04 (±2.36)	3.59	145	< **0.01***

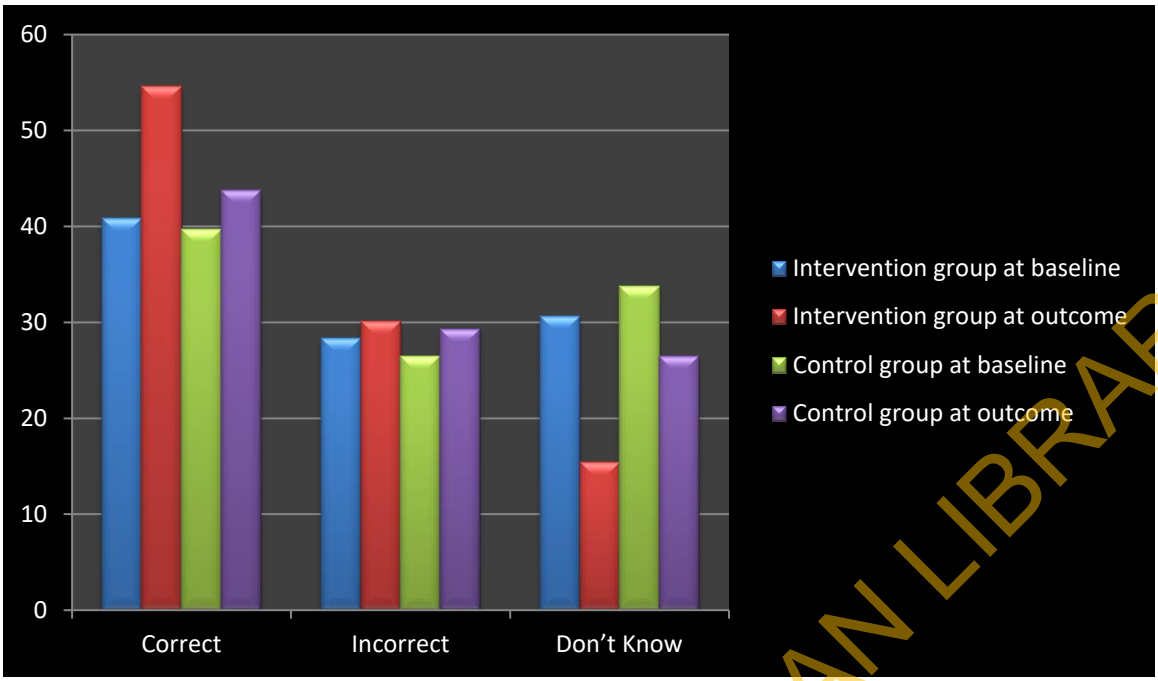

Figure 4.2: Comparisons of overall percentage scores on the Knowledge of ADHD questionnaire at baseline and post intervention in the two groups

On the ADHD Knowledge Questionnaire, the percentage correct responses in the intervention group were 54.6% compared with 43.7% in the controls. Inaccurate responses were 28.31% in the intervention group and 26.5% in the controls. "Don't know" responses were 30.6% in the intervention group and 33.8% in the controls. Figure 4.2 above illustrates the comparisons of percentage correct, incorrect and don't know responses on the Knowledge of ADHD questionnaire at baseline and post intervention in the two groups.

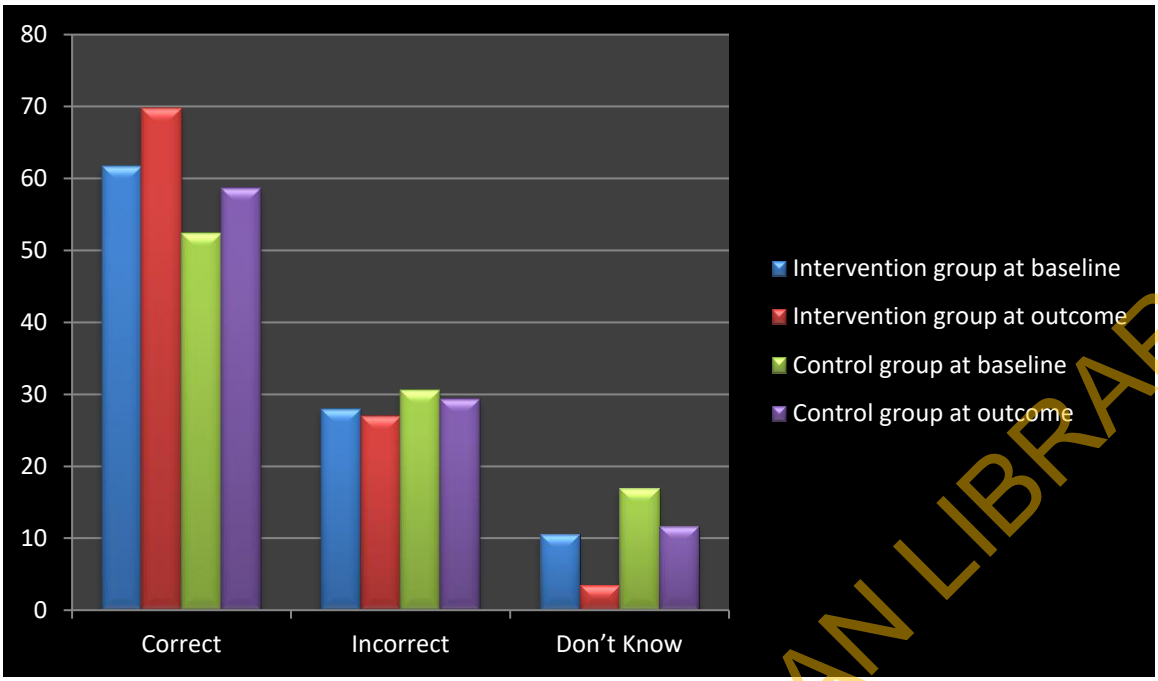

Figure 4.3: Comparisons of overall percentage scores on the ADHD Knowledge of behavioural intervention questionnaire at baseline and post intervention in the two groups

Figure 4.3 above illustrates the comparisons of percentage correct, incorrect and don't know responses on the Knowledge of behavioural intervention for ADHD questionnaire. The percentage correct responses for the intervention group were 69.7% compared with 58.7% in the controls. Incorrect responses were 27.0% in the intervention group and 29.3% in the controls. Don't know responses were 3.5% in the intervention group and 11.6% in the controls.

On Table 4.8a the two groups differed on 3 items of the ADHD Knowledge questionnaire with the intervention group scoring better than the control group on all 3 items {'There are a greater number of boys than girls with ADHD' ($\chi^2 = 8.23$, $p < 0.01$), 'A child who is not over-active, but fails to pay attention, may have ADHD' ($\chi^2 = 5.61$, $p < 0.02$) and 'Approximately 5% of Nigerian school-aged children have ADHD' ($\chi^2 = 4.20$, $p < 0.04$) }.

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Table 4.8a: Comparison of correctness of responses on items of the Knowledge questionnaire between the intervention group and the control group post intervention (N = 147)

Description	Intervention N = 76 n (%)	Control N = 71 n (%)	χ^2	p
There are a greater number of boys than girls with ADHD				
Correct	53 (62.4)	32 (37.6)	8.23 [Y]	**< 0.01***
Incorrect/don't know	23 (37.1)	39 (62.9)		
There is approximately 1 child in every classroom with a diagnosis of ADHD				
Correct	50 (56.8)	38 (43.2)	2.29	0.13
Incorrect/don't know	26 (44.1)	33 (55.9)		
If medication is prescribed, educational interventions are often unnecessary				
Correct	51 (56.7)	39 (43.3)	2.29	0.13
Incorrect/don't know	25 (43.9)	32 (56.1)		
Children with ADHD are born with biological vulnerabilities towards inattention and poor self control				
Correct	47 (57.3)	35 (42.7)	2.34	0.13
Incorrect/don't know	29 (44.6)	36 (55.4)		
If a child responds to stimulant medication (e.g., Ritalin) then they probably have ADHD				
Correct	15 (46.9)	17 (53.1)		
Incorrect/don't know	61 (53.0)	54 (47.0)	0.38	0.54
A child who is not over-active, but fails to pay attention, may have ADHD				
Correct	54 (60.0)	36 (40.0)	5.61 [Y]	**0.02***
Incorrect/don't know	22 (38.6)	35 (61.4)		
ADHD is often caused by food additives				
Correct	45 (50.0)	45 (50.0)	0.27	0.60
Incorrect/don't know	31 (54.4)	26 (45.6)		
ADHD can be diagnosed in the doctor's office most of the time				
Correct	36 (53.7)	31 (46.3)	0.20	0.65
Incorrect/don't know	40 (50.0)	40 (50.0)		
Children with ADHD always need a quiet environment to concentrate				
Correct	18 (60.0)	12 (40.0)	1.04	0.31
Incorrect/don't know	58 (49.6)	59 (50.4)		
Approximately 5% of Nigerian school-aged children have ADHD				
Correct	57 (58.2)	41 (41.8)	4.20[Y]	**0.04***
Incorrect/don't know	19 (38.8)	30 (61.2)		
Children with ADHD are usually from single parent families				
Correct	38 (45.2)	46 (54.8)	3.28	0.07
Incorrect/don't know	38 (60.3)	25 (39.7)		

Y: Yates Corrected

*Significant at p<0.05

Table 4.8b shows that the scores of the groups on the other items of the Knowledge questionnaire differ on six items with the intervention group scoring better than the control group on all {'Diets are usually not helpful in treating most children with ADHD' (χ^2=5.04, p=0.02), 'ADHD can be inherited' (χ^2=6.71, p=0.01), 'There are subtypes of ADHD' (χ^2=11.32, p<0.001), 'Children with ADHD cannot sit still long enough to pay attention' (χ^2=9.30, p=0.002), 'Family dysfunction increases likelihood that a child will be diagnosed with ADHD' (χ^2=19.54, p=0.001), and 'ADHD can affect both the rich and the poor' (χ^2=9.41, p=0.002)}.

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Table 4.8b: Comparison of correctness of responses on items of the Knowledge questionnaire between the intervention group and the control group post intervention (Contd)

Description	Intervention N = 76 n (%)	Control N = 71 n (%)	χ^2	p
Diets are usually not helpful in treating most children with ADHD				
Correct	35 (64.8)	19 (35.2)	5.04[Y]	**0.02***
Incorrect/don't know	41 (44.1)	52 (55.9)		
ADHD can be inherited				
Correct	66 (57.9)	48 (42.1)	6.71[Y]	**0.01***
Incorrect/don't know	10 (30.3)	23 (69.7)		
Medication is a cure for ADHD				
Correct	29 (53.7)	25 (46.3)	0.14	0.71
Incorrect/don't know	47 (50.5)	46 (49.5)		
All children with ADHD are over-active				
Correct	27 (60.0)	18 (40.0)	1.79	0.18
Incorrect/don't know	49 (48.0)	53 (52.0)		
There are subtypes of ADHD				
Correct	55 (64.0)	31 (36.0)	11.32[Y]	< **0.001***
Incorrect/don't know	21 (34.4)	40 (65.6)		
ADHD affects male children only				
Correct	62 (56.4)	48 (43.6)	3.11[Y]	0.07
Incorrect/don't know	14 (37.8)	23 (62.2)		
The cause of ADHD is unknown				
Correct	25 (62.5)	15 (37.5)	2.57	0.11
Incorrect/don't know	51 (47.7)	56 (52.3)		
ADHD is the result of poor parenting practices				
Correct	37 (50.7)	36 (49.3)	0.06	0.81
Incorrect/don't know	39 (52.7)	35 (47.3)		
If a child can play Nintendo for hours, than s/he probably doesn't have ADHD				
Correct	36 (62.1)	22 (37.9)	3.81[Y]	0.06
Incorrect/don't know	40 (44.9)	49 (55.1)		
Children with ADHD cannot sit still long enough to pay attention				
Correct	68 (58.6)	48 (41.4)	9.30[Y]	**0.002***
Incorrect/don't know	8 (25.8)	23 (74.2)		
ADHD is caused by too much sugar in the diet				
Correct	35 (44.9)	43 (55.1)	3.10	0.08
Incorrect/don't know	41 (59.4)	28 (40.6)		
Family dysfunction increases likelihood that a child will be diagnosed with ADHD				
Correct	49 (72.1)	19 (27.9)	19.54[Y]	< **0.001***
Incorrect/don't know	27 (34.2)	52 (65.8)		
ADHD can affect both the rich and the poor				
Correct	65 (59.6)	44 (40.4)	9.41[Y]	**0.002***
Incorrect/don't know	11 (28.9)	27 (71.1)		
Children with ADHD usually have good peer relations				
Correct	32 (50.8)	31 (49.2)	0.04	0.84
Incorrect/don't know	44 (52.4)	40 (47.6)		
Research has shown that prolonged use of stimulant medications leads to increased addiction				
Correct	16 (72.7)	6 (27.3)	3.60[Y]	0.06
Incorrect/don't know	60 (48.0)	65 (52.0)		
Children with ADHD generally display an inflexible adherence to specific routines and rituals				
Correct	19 (59.4)	13 (40.6)	0.97	0.33
Incorrect/don't know	57 (49.6)	58 (50.4)		

Table 4.9a shows that the attitude of teachers in the intervention group had improved significantly compared to that of the controls. The intervention group had significantly less negative attitude on all 6 items which are 'ADHD is a valid diagnosis' (t=-2.67, p=0.008),' ADHD is a behavioural disorder that should not be treated with medication' (t=-2.73, p=0.007), 'I would feel frustrated having to teach a child with ADHD' (t=-2.06, p=0.042), 'Children with ADHD should be taught by special education teachers' ((t=-3.89, p=0.000), 'I would prefer to teach a student who was over-active than one who was inattentive' ((t=-2.03, p=0.044) and 'Children with ADHD should not be taught in the regular school system' ((t=-2.24, p=0.026).

Table 4.9a: Comparison of teachers' mean scores on the attitude scale at first post intervention in the intervention and the control group

Items	**Intervention group n = 84 Mean (SD)**	**Control group n = 75 Mean (SD)**	**t**	**df**	**P**
ADHD is a valid diagnosis	2.38 (±1.14)	2.89 (±1.15)	-2.67	145	**0.008***
ADHD is an excuse for children to misbehave	2.53 (±1.26)	2.48 (±1.01)	0.25	145	0.62
ADHD is diagnosed too often	2.74 (±0.99)	2.82 (±0.96)	-0.50	145	0.62
ADHD is a behavioural disorder that should not be treated with medication	2.29 (±1.13)	2.80 (±1.15)	-2.73	145	**0.007***
All children with ADHD should take medication	2.88 (±1.25)	2.87 (±1.28)	0.04	145	0.97
Medications such as Ritalin and Dexamphetamine should only be used as a last resort	3.04 (±1.08)	2.97 (±0.91)	0.41	145	0.68
ADHD is a legitimate educational problem	2.75 (±1.26)	2.86 (±1.05)	-0.57	145	0.57
Having a child with ADHD in my class would disrupt my teaching	3.24 (±1.26)	3.34 (±1.20)	-0.50	145	0.62
I would feel frustrated having to teach a child with ADHD	2.54 (±1.17)	2.93 (±1.13)	-2.06	145	**0.042***
Young children with ADHD should be treated more leniently than older children with ADHD	3.59 (±1.18)	3.58 (±1.13)	0.08	145	0.94
Children with ADHD should be taught by special education teachers	3.08 (±1.30)	3.86 (±1.11)	-3.89	145	**0.000***
I would prefer to teach a student who was over-active than one who was inattentive	2.72 (±1.16)	3.14 (±1.32)	-2.03	145	**0.044***
Most students with ADHD do not really disrupt classes that much	3.30 (±1.13)	3.24 (±1.13)	0.34	145	0.74
Children with ADHD should not be taught in the regular school system	2.38 (±1.18)	2.85 (±1.33)	-2.24	145	**0.026***
The extra time teachers spend with students with ADHD is at the expense of students without ADHD	3.21 (±1.28)	3.42 (±1.04)	-1.1	145	0.27
Other students do not learn as well as they should when there is a child with ADHD in the class	2.97 (±1.22)	3.23 (±1.12)	-1.30	145	0.20
You cannot expect as much from a child with ADHD as you can from other children	3.80 (±1.01)	3.63 (±0.96)	1.04	145	0.30
Children with ADHD could control their behaviour if they really wanted to	2.96 (±1.06)	3.28 (±1.11)	-1.79	145	0.08

Higher scores indicate more negative attitude

***Significant at** $p<0.05$

Table 4.9b shows that the attitude of teachers in the intervention group only improved significantly on an item which is 'Managing the behaviour of students with ADHD is easy' (t= -6.89, p=**0.000)** compared to 2 items in the controls namely 'I have the skills to deal with children with ADHD in my class' (t=3.23, p=0.002) and 'I have the ability to effectively manage students with ADHD' (t=2.97, p=0.003).

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Table 4.9b: Comparison of teachers' mean scores on the attitude scale at first post intervention in the intervention and the control group (Contd)

Items	**Intervention group n = 84 Mean (SD)**	**Control group n = 75 Mean (SD)**	**t**	**df**	**p**
Children with ADHD misbehave because they are naughty	2.63 (±1.28)	2.99 (±1.18)	-1.74	145	0.08
Children with ADHD cannot change the way they behave	2.37 (±1.21)	2.59 (±1.10)	-1.17	145	0.25
Students with ADHD could do better if only they'd try harder	3.68 (±1.06)	3.66 (±0.86)	0.14	145	0.89
Children with ADHD misbehave because they don't like following rules	2.75 (±1.27)	2.94 (±1.13)	-0.98	145	0.33
Students with ADHD are just as difficult to manage in the classroom as any student	2.71 (±1.26)	2.76 (±1.09)	-0.26	145	0.80
Managing the behaviour of students with ADHD is easy	2.49 (±1.14)	3.66 (±0.91)	-6.89	145	**0.000***
I have the skills to deal with children with ADHD in my class	3.37 (±1.02)	2.83 (±1.00)	3.23	145	**0.002***
I have the ability to effectively manage students with ADHD	3.36 (±1.04)	2.85 (±1.04)	2.97	145	**0.003***
I am limited in the way I manage a child with ADHD	3.18 (±1.17)	3.10 (±1.00)	0.47	145	0.64
My school has policies that regulate how teachers manage a child with ADHD	3.05 (±1.06)	3.08 (±1.08)	-0.18	145	0.86
Other staff influence how I would manage a child with ADHD	3.03 (±1.18)	2.96 (±1.06)	0.37	145	0.71
Parents of students with ADHD influence how I would manage a child with ADHD	3.05 (±1.25)	2.73 (±1.16)	1.61	145	0.11

Higher scores indicate more negative attitude

***Significant at p<0.005**

The scores of participants on the KBIQ differed significantly on three items with the intervention group scoring better than the control group on all three. These items are 'The position where a child with ADHD sits in the classroom does not really affect their behaviour or learning as long as they feel comfortable' (χ^2=17.17, p<0.001), 'Children with ADHD may need extra breaks if a classroom activity requires lengthy periods of sitting' (χ^2 = 8.82, p=0.003) and 'Ignoring minor misbehavior of a child with ADHD can help to better manage their behaviour in the classroom' (χ^2 =6.63, p= 0.01) (Table 4.10a).

Table 4.10a: Comparison of correctness of responses on items from the Knowledge of behavioural intervention questionnaire between the intervention group and the control group post intervention

Description	Intervention N = 76 n (%)	Control N = 71 n (%)	χ^2	p
The position where a child with ADHD sits in the classroom does not really affect their behaviour or learning as long as they feel comfortable				
Correct	51 (69.9)	22 (30.1)	17.71[Y]	**<0.001***
Incorrect/don't know	25 (33.8)	49 (66.2)		
A child with ADHD is likely to work better when paired to work with one other student than in larger groups of children				
Correct	58 (52.7)	52 (47.3)	0.18	0.67
Incorrect/don't know	18 (48.6)	19 (51.4)		
Children with ADHD don't usually have problem with moving from one classroom activity to another activity				
Correct	46 (54.8)	38 (45.2)	0.73	0.39
Incorrect/don't know	30 (47.6)	33 (52.4)		
Children with ADHD may need extra breaks if a classroom activity requires lengthy periods of sitting				
Correct	62 (60.2)	41 (39.8)	8.82[Y]	**0.003***
Incorrect/don't know	14 (31.8)	30 (68.2)		
Punishing children with ADHD for bad behaviour is more effective in changing their behaviour than rewarding them for good behaviour				
Correct	59 (55.1)	48 (44.9)	1.86	0.17
Incorrect/don't know	17 (42.5)	23 (57.5)		
It is better to delay punishing a child with ADHD for two days after the bad behaviour as this allows the child to think of what they did wrong				
Correct	43 (48.3)	46 (51.7)	1.04	0.31
Incorrect/don't know	33 (56.9)	25 (43.1)		
Ignoring minor misbehavior of a child with ADHD can help to better manage their behaviour in the classroom				
Correct	45 (63.4)	26 (36.6)	6.63[Y]	**0.01***
Incorrect/don't know	31 (40.8)	45 (59.2)		

Y: Yates Corrected

***Significant at p<0.05**

On Table 4.10b, the groups differed significantly on 2 items and the intervention group scored better on these. These items are 'Corporal punishment such as beating a child with stick is the best method for teachers to improve the behaviour of children with ADHD because these children are very difficult to manage' (χ^2 = 6.41, p=0.01) and 'Frequent praise for a child with ADHD is not good for them as they become "big-headed" and start behaving badly' (χ^2= 5.56, p=0.02).

Table 4.10b: Comparison of correctness of responses on items from the Knowledge of behavioural intervention questionnaire between the intervention group and the control group post intervention (Contd) (N = 147)

Description	Intervention N = 76 n (%)	Control N = 71 n (%)	χ^2	P
Children with ADHD need more monitoring during less structured times such as break times				
Correct	58 (52.7)	52 (47.3)		
Incorrect/don't know	18 (48.6)	19 (51.4)	0.18	0.67
Corporal punishment such as beating a child with stick is the best method for teachers to improve the behaviour of children with ADHD because these children are very difficult to manage				
Correct	71 (56.3)	55 (43.7)		
Incorrect/don't know	5 (23.8)	16 (76.2)	6.41 Y	**0.01***
Having non-academic programmes such as Physical Education in the morning and having academic subjects such as Mathematics in the afternoon is better for children with ADHD as they are more alert in the afternoon				
Correct	50 (50.0)	50 (50.0)		
Incorrect/don't know	26 (55.3)	21 (44.7)	0.36	0.55
Using colourful and stimulating teaching material is good for other children but not for children with ADHD as it can make them too excited				
Correct	41 (53.9)	35 (46.1)		
Incorrect/don't know	35 (49.3)	36 (50.7)	0.32	0.57
Frequent praise for a child with ADHD is not good for them as they become "big-headed" and start behaving badly				
Correct	52 (59.8)	35 (40.2)		
Incorrect/don't know	24 (40.0)	36 (60.0)	5.56	**0.02***

Y: Yates Corrected

***Significant at p<0.05**

SECTION III

The third section compared the intervention group at baseline, post intervention and post booster (Tables 4.11, 4.12, 4.13a, 4.13b, 4.14a, 4.14b and Figures 4.4 and 4.5)

Table 4.11 shows that there were statistically significant increases in the scores of the teachers on ADHD Knowledge questionnaire (t=-8.33, p<0.001)), the Knowledge of Behavioural Intervention questionnaire (t=5.22, p<0.001) and statistically significant reduction on the ADHD attitude questionnaire (t= -3.11, p=0.003).

Table 4.11: Within group differences in pre intervention and post intervention scores on the knowledge of ADHD, and attitude towards ADHD, and Knowledge of Behavioural Intervention items in the intervention group

Continuous variables	**Pre-intervention n = 76** **Mean (SD)**	**Post-intervention n = 76** **Mean (SD)**	**t**	**df**	**P**
Knowledge of ADHD score	11.03 (±4.13)	14.74 (±3.25)	-8.33	75	**< 0.001***
Attitude towards ADHD score	93.59(±10.28)	88.08 (±7.67)	5.22	75	**< 0.001***
Knowledge of Behavioural intervention	7.39 (±2.88)	8.37 (±2.12)	-3.11	75	**0.003***

***Significant at p<0.05**

Comparison of the scores after the first training (Post intervention) and the second training (Post booster) showed statistically significant increase only in the scores on the ADHD Knowledge questionnaire (t=-2.12, p=0.04). However, there was a further increase in the mean score on the Knowledge of Behavioural Intervention questionnaire as well as a further reduction in the attitude scores on the post booster measures even though these differences were not statistically significant. This shows that the second (booster) training also contributed to increase in the knowledge of the teachers on ADHD (Table 4.12).

Table 4.12: Within group differences in post intervention and post booster mean scores on the knowledge of ADHD, and attitude towards ADHD, and Knowledge of Behavioural Intervention items in the intervention group

Continuous variables	**Post-intervention n = 75 Mean (SD)**	**Post-Booster n = 75 Mean (SD)**	**t**	**df**	**P**
Knowledge of ADHD score	14.83 (±3.18)	15.48 (±3.53)	-2.12	74	**0.04***
Attitude to ADHD score	88.13(±7.71)	86.92(±8.95)	1.22	74	0.23
Knowledge of Behavioural intervention	8.40 (±2.11)	8.81(±2.07)	-1.67	74	0.10

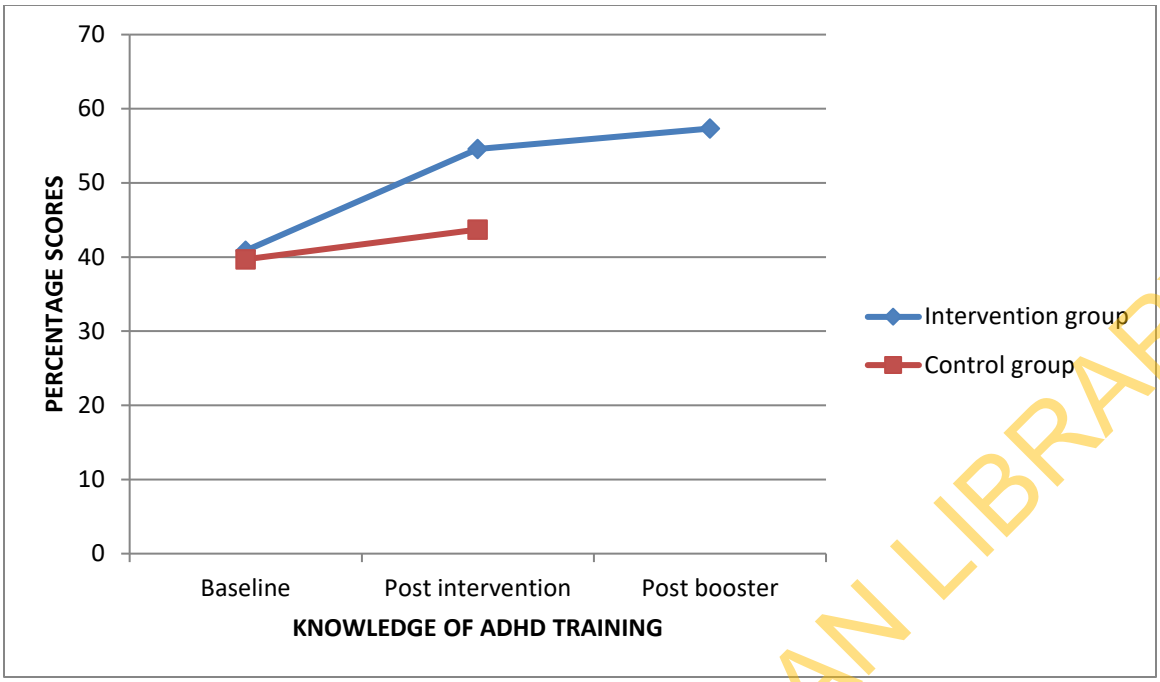

Figure 4.4: Comparisons of the pre and post intervention percentage scores on knowledge of ADHD questionnaire in the Intervention and the control groups

The overall percentage scores of the intervention group on the ADHD knowledge at baseline was 40.9% and 54.6% post intervention while it was 57.3% post booster. This was compared with baseline (39.7%) and post-intervention (43.7%) scores in the controls (Figure 4.4).

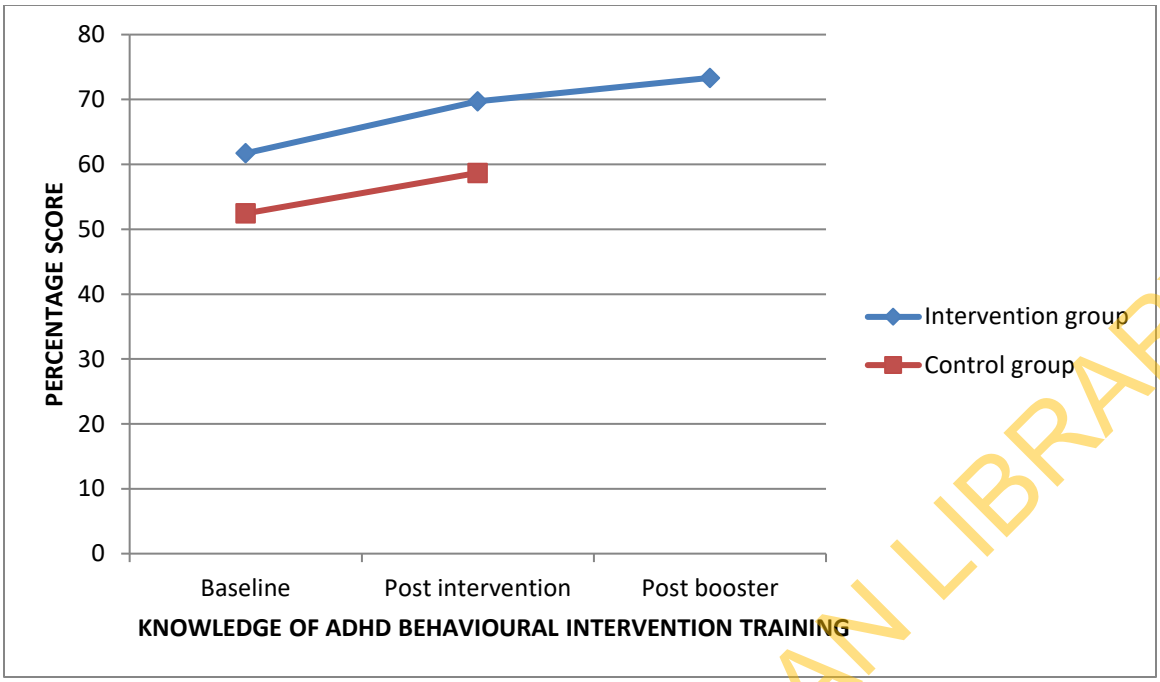

Figure 4.5: Comparisons of the pre and post intervention percentage scores on knowledge of ADHD behavioural intervention questionnaires in the intervention and the control groups

The overall percentage scores of the intervention group on the knowledge of ADHD behavioural intervention at baseline was 61.7% and 69.7% post intervention while it was 73.3% post booster. This was compared with baseline (52.4%) and post-intervention (58.7%) scores in the controls (Figure 4.5).

There were statistically significant reductions on the mean scores of the participants on 6 items post intervention compared with baseline mean scores. These items are 'ADHD is a valid diagnosis' (t=3.73, p=0.000), 'ADHD is a behavioural disorder that should not be treated with medication' (t=3.34, p=0.001), 'Most students with ADHD do not really disrupt classes that much' (t=2.31, p=0.02), 'Children with ADHD should not be taught in the regular school system' (t=2.20, p=0.03), 'You cannot expect as much from a child with ADHD as you can from other children' (t=-2.00, p=0.049) and 'Children with ADHD could control their behaviour if they really wanted to' (t=2.82, p=0.006) (Table 4.13a).

Table 4.13a: Comparison of teachers' mean scores on the attitude scale at baseline and post first intervention in the intervention group

Items	Pre-intervention n = 76 Mean (SD)	Post-intervention 1 n = 76 Mean (SD)	t	df	p
ADHD is a valid diagnosis	3.01 (±1.14)	2.38 (±1.14)	3.73	75	**0.000***
ADHD is an excuse for children to misbehave	2.55 (±1.20)	2.53 (±1.26)	0.14	75	0.89
ADHD is diagnosed too often	2.72 (±1.08)	2.74 (±0.99)	-0.90	75	0.93
ADHD is a behavioural disorder that should not be treated with medication	2.99 (±1.40)	2.29 (±1.13)	3.34	75	**0.001***
All children with ADHD should take medication	2.74 (±1.23)	2.88 (±1.25)	0.78	75	0.44
Medications such as Ritalin and Dexamphetamine should only be used as a last resort	3.28 (±1.14)	3.04 (±1.08)	1.57	75	0.12
ADHD is a legitimate educational problem	3.05 (±1.31)	2.75 (±1.26)	-1.92	75	0.06
Having a child with ADHD in my class would disrupt my teaching	3.25 (±1.35)	3.24 (±1.26)	0.08	75	0.94
I would feel frustrated having to teach a child with ADHD	2.84 (±1.35)	2.54 (±1.17)	1.84	75	0.07
Young children with ADHD should be treated more leniently than older children with ADHD	3.38 (±1.30)	3.59 (±1.18)	-1.18	75	0.24
Children with ADHD should be taught by special education teachers	3.42 (±1.30)	3.08 (±1.30)	1.92	75	0.06
I would prefer to teach a student who was over-active than one who was inattentive	2.78 (±1.25)	2.72 (±1.16)	0.28	75	0.78
Most students with ADHD do not really disrupt classes that much	3.62 (±1.02)	3.30 (±1.13)	2.31	75	**0.02***
Children with ADHD should not be taught in the regular school system	2.78 (±1.28)	2.38 (±1.78)	2.20	75	**0.03***
The extra time teachers spend with students with ADHD is at the expense of students without ADHD	3.43 (±1.20)	3.21 (±1.28)	1.40	75	0.16
Other students do not learn as well as they should when there is a child with ADHD in the class	3.09 (±1.41)	2.97 (±1.22)	0.65	75	0.52
You cannot expect as much from a child with ADHD as you can from other children	3.50 (±1.18)	3.80 (±1.01)	-2.00	75	**0.049***
Children with ADHD could control their behaviour if they really wanted to	3.43 (±1.08)	2.96 (±1.06)	2.82	75	**0.006***
Children with ADHD misbehave because they are naughty	2.83 (±1.31)	2.63 (±1.28)	1.10	75	0.28
Children with ADHD cannot change the way they behave	2.55 (±1.25)	2.37 (±1.21)	1.06	75	0.29
Students with ADHD could do better if only they'd try harder	3.54 (±1.16)	3.68 (±1.06)	-0.85	75	0.40
Children with ADHD misbehave because they don't like following rules	2.74 (±1.06)	2.75 (±1.27)	-0.09	75	0.93

Higher scores indicate more negative attitude
***Significant at p<0.05**

In the intervention group, there were statistically significant reductions on their mean scores on 3 items post intervention compared with baseline scores on the other items of the Attitude scale (Table 4.13b). These items are 'Managing the behaviour of students with ADHD is easy' (t=6.48, p=0.000), 'I have the skills to deal with children with ADHD in my class' (t=3.47, p=0.001) and 'I have the ability to effectively manage students with ADHD' (t=2.99, p=0.004).

Table 4.13b: Comparison of teachers' mean scores on the attitude scale at baseline and post first intervention in the intervention group (Contd)

Items	**Pre-intervention n = 76** **Mean (SD)**	**Post-intervention 1 n = 76** **Mean (SD)**	**t**	**df**	**p**
Students with ADHD are just as difficult to manage in the classroom as any student	3.28 (±1.26)	2.92 (±1.33)	1.56	74	0.12
Managing the behaviour of students with ADHD is easy	3.63 (±1.10)	2.40 (±1.12)	6.48	74	**0.000***
I have the skills to deal with children with ADHD in my class	3.48 (±0.96)	2.81 (±1.14)	3.47	74	**0.001***
I have the ability to effectively manage students with ADHD	3.55 (±1.00)	2.93 (±1.18)	2.99	74	**0.004***
I am limited in the way I manage a child with ADHD	2.99 (±1.15)	3.32 (±1.14)	-1.91	74	0.06
My school has policies that regulate how teachers manage a child with ADHD	3.05 (±1.21)	3.63 (±3.61)	-1.28	74	0.21
Other staff influence how I would manage a child with ADHD	3.19 (±1.12)	3.21 (±1.09)	-0.15	74	0.89
Parents of students with ADHD influence how I would manage a child with ADHD	2.95 (±1.22)	3.16 (±1.38)	-1.03	74	0.31

Higher scores indicate more negative attitude
***Significant at p<0.05**

When the mean scores obtained post booster were compared with what was obtained at baseline on the attitude scale, the number of items on which there were statistically significant reductions increased. Table 4.14a shows that the second training contributed further in improving the attitude of teachers towards ADHD. The items on which there were statistically significant reductions were 'ADHD is a valid diagnosis' ($t=4.28$, $p<0.001$), 'ADHD is a behavioural disorder that should not be treated with medication ' ($t=2.46$, $p=0.02$), 'Medications such as Ritalin and Dexamphetamine should only be used as a last resort' ($t=2.84$, $p<0.01$), 'ADHD is a legitimate educational problem' ($t=2.02$, $p<0.05$), 'Having a child with ADHD in my class would disrupt my teaching' ($t=2.15$, $p=0.04$), 'Children with ADHD should be taught by special education teachers' ($t=2.48$, $p=0.02$) and 'Children with ADHD should not be taught in the regular school system' ($t=2.43$, $p=0.02$).

TABLE 4.14a: Comparison of teachers' mean scores on the attitude scale at baseline and post second (booster) intervention in the intervention group

Items	**Pre-intervention n = 75 Mean (SD)**	**Post-intervention 2 n = 75 Mean (SD)**	**t**	**P**
ADHD is a valid diagnosis	3.01 (±1.32)	2.32 (±1.18)	4.28	**< 0.001***
ADHD is an excuse for children to misbehave	2.55 (±1.21)	2.49 (±1.28)	0.35	0.73
ADHD is diagnosed too often	2.72 (±1.08)	2.75 (±1.12)	-0.16	0.88
ADHD is a behavioural disorder that should not be treated with medication	2.99 (±1.40)	2.45 (±1.78)	2.46	**0.02***
All children with ADHD should take medication	2.72 (±1.23)	2.88 (±1.19)	0.93	0.34
Medications such as Ritalin and Dexamphetamine should only be used as a last resort	3.28 (±1.15)	2.80 (±1.17)	2.84	**< 0.01***
ADHD is a legitimate educational problem	3.03 (±1.29)	2.68 (±1.14)	2.02	**< 0.05***
Having a child with ADHD in my class would disrupt my teaching	3.25 (±1.36)	2.87 (±1.30)	2.15	**0.04***
I would feel frustrated having to teach a child with ADHD	2.84 (±1.36)	2.59 (±1.08)	1.51	0.14
Young children with ADHD should be treated more leniently than older children with ADHD	3.37 (±1.30)	3.35 (±1.23)	0.14	0.89
Children with ADHD should be taught by special education teachers	3.41 (±1.31)	2.89 (±1.38)	2.48	**0.02***
I would prefer to teach a student who was over-active than one who was inattentive	2.77 (±1.26)	2.96 (±1.24)	-1.09	0.28
Most students with ADHD do not really disrupt classes that much	3.61 (±1.03)	3.35 (±1.19)	1.86	0.07
Children with ADHD should not be taught in the regular school system	2.76 (±1.28)	2.35 (±1.20)	2.43	**0.02***

Higher scores indicate more negative attitude
***Significant at p<0.05**

Similarly, Table 4.14b shows that the second training contributed further in improving the attitude of teachers towards ADHD. There were statistically significant differences between the baseline scores and the post intervention scores on 5 items namely 'The extra time teachers spend with students with ADHD is at the expense of students without ADHD ($t=2.61$, $p=0.01$) 'Children with ADHD could control their behaviour if they really wanted to' ($t=2.85$, $p<0.01$), 'Managing the behaviour of students with ADHD is easy' ($t=6.48$, $p<0.001$), 'I have the skills to deal with children with ADHD in my class' ($t=3.47$, $p=0.001$) and 'I have the ability to effectively manage students with ADHD' ($t=-1.91$, $p=0.06$).

TABLE 4.14b: Comparison of teachers' mean scores on the attitude scale at baseline and post second (booster) intervention in the intervention group (Contd)

Items	**Pre-intervention n = 75 Mean (SD)**	**Post-intervention 2 n = 75 Mean (SD)**	**t**	**p**
The extra time teachers spend with students with ADHD is at the expense of students without ADHD	3.44 (±1.21)	2.96 (±1.25)	2.61	**0.01***
Other students do not learn as well as they should when there is a child with ADHD in the class	3.09 (±1.42)	2.80 (±1.16)	1.65	0.10
You cannot expect as much from a child with ADHD as you can from other children	3.49 (±1.19)	3.52 (±1.17)	-0.15	0.88
Children with ADHD could control their behaviour if they really wanted to	3.44 (±1.08)	2.97 (±1.22)	2.85	**<0.01***
Children with ADHD misbehave because they are naughty	2.83 (±1.32)	2.63 (±1.36)	0.95	0.35
Children with ADHD cannot change the way they behave	2.53 (±1.25)	2.47 (±1.22)	0.39	0.70
Students with ADHD could do better if only they'd try harder	3.53 (±1.17)	3.61 (±1.13)	-0.52	0.61
Children with ADHD misbehave because they don't like following rules	2.73 (±1.07)	2.85 (±1.23)	-0.78	0.44
Students with ADHD are just as difficult to manage in the classroom as any student	3.28 (±1.26)	2.92 (±1.33)	1.56	0.12
Managing the behaviour of students with ADHD is easy	3.63 (±1.10)	2.40 (±1.12)	6.48	**< 0.001***
I have the skills to deal with children with ADHD in my class	3.48 (±0.96)	2.81 (±1.14)	3.47	**0.001***
I have the ability to effectively manage students with ADHD	3.55 (±1.00)	2.93 (±1.18)	2.99	**0.004***
I am limited in the way I manage a child with ADHD	2.99 (±1.15)	3.32 (±1.14)	-1.91	0.06
My school has policies that regulate how teachers manage a child with ADHD	3.05 (±1.21)	3.63 (±3.61)	-1.28	0.21
Other staff influence how I would manage a child with ADHD	3.19 (±1.12)	3.21 (±1.09)	-0.15	0.89
Parents of students with ADHD influence how I would manage a child with ADHD	2.95 (±1.22)	3.16 (±1.38)	-1.03	0.31

Higher scores indicate more negative attitude
***Significant at p<0.05**

SECTION IV

This section compared the control group at baseline and post intervention and also explored the sociodemographic correlates of baseline knowledge and attitude among teachers (Tables 4.15, 4.16, 4.17, 4.18, 4.19, 4.20).

There were no statistically significant differences in the post intervention scores on the ADHD Knowledge, the ADHD attitude and the Knowledge of Behavioural Intervention as shown on Table 4.15. However, there was an increase in the mean scores on the Knowledge of ADHD, Knowledge of Behavioural Intervention as well as a reduction in the attitude scores even though these differences were not statistically significant. This could mean that merely bringing this condition to the awareness of the teachers sensitised them and probably led to the teachers attempting to find out more (Table 4.15).

Table 4.15: Within group differences in pre and post intervention scores on the knowledge of ADHD, and attitude towards ADHD, and Knowledge of Behavioural Intervention items in the control group

Continuous variables	**Pre intervention n = 76** **Mean ± SD**	**Post-intervention n = 76** **Mean ± SD**	**t**	**P**
Knowledge of ADHD score	11.04 ±4.01	11.80 ±3.50	-1.67	0.10
Attitude towards ADHD score	93.49 ±8.14	92.37 ±8.94	0.93	0.35
Knowledge of Behavioural intervention	6.54 ±2.69	7.04 ±2.36	-1.42	0.16

Table 4.16 shows the comparison of teachers' attitude scores at first and second assessment in the control group. On comparison of items on the attitude measure, the mean scores only reduced significantly on one item {'Other students do not learn as well as they should when there is a child with ADHD in the class' (t=2.04, p=0.045)} and increased significantly on one item {'ADHD is a legitimate educational problem' (t=-2.48, p=0.02)}.

Table 4.16: Comparison of teachers' mean scores on the attitude scale at first and second assessment in the control group

Items	1st assessment n = 71 Mean (SD)	2nd assessment n = 71 Mean (SD)	t	p
ADHD is a valid diagnosis	2.85 (±1.14)	2.89 (±1.15)	-0.21	0.83
ADHD is an excuse for children to misbehave	2.41 (±1.09)	2.48 (±1.01)	-0.39	0.70
ADHD is diagnosed too often	2.90 (±0.96)	2.82 (±0.96)	0.59	0.56
ADHD is a behavioural disorder that should not be treated with medication	2.66 (±1.29)	2.80 (±1.15)	0.67	0.51
All children with ADHD should take medication	2.70 (±1.18)	2.87 (±1.28)	-0.69	0.39
Medications such as Ritalin and Dexamphetamine should only be used as a last resort	3.08 (±1.07)	2.97 (±0.91)	0.75	0.45
ADHD is a legitimate educational problem	2.49 (±1.07)	2.86 (±1.05)	-2.48	**0.02***
Having a child with ADHD in my class would disrupt my teaching	3.37 (±1.26)	3.34 (±1.20)	0.17	0.87
I would feel frustrated having to teach a child with ADHD	3.25 (±1.25)	2.93 (±1.13)	1.86	0.07
Young children with ADHD should be treated more leniently than older children with ADHD	3.52 (±1.32)	3.58 (±1.13)	-0.30	0.77
Children with ADHD should be taught by special education teachers	3.75 (±1.26)	3.86 (±1.11)	-0.68	0.50
I would prefer to teach a student who was over-active than one who was inattentive	3.04 (±1.22)	3.14 (±1.32)	0.45	0.65
Most students with ADHD do not really disrupt classes that much	3.24 (±1.21)	3.24 (±1.13)	<0.001	1.00
Children with ADHD should not be taught in the regular school system	3.03 (±1.36)	2.85 (±1.33)	0.93	0.36
The extra time teachers spend with students with ADHD is at the expense of students without ADHD	3.68 (±1.13)	3.42 (±1.04)	1.36	0.18
Other students do not learn as well as they should when there is a child with ADHD in the class	3.62 (±1.15)	3.23 (±1.12)	2.04	**0.045***
You cannot expect as much from a child with ADHD as you can from other children	3.51 (±1.24)	3.63 (±0.96)	-0.66	0.51
Children with ADHD could control their behaviour if they really wanted to	3.20 (±1.26)	3.28 (±1.11)	-0.44	0.67
Children with ADHD misbehave because they are naughty	2.68 (±1.16)	2.99 (±1.18)	-1.74	0.09
Children with ADHD cannot change the way they behave	2.76 (±1.40)	2.59 (±1.10)	0.94	0.35
Students with ADHD could do better if only they'd try harder	3.63 (±1.17)	3.66 (±0.86)	-0.18	0.86
Children with ADHD misbehave because they don't like following rules	2.97 (±1.23)	2.94 (±1.13)	0.17	0.86
Students with ADHD are just as difficult to manage in the classroom as any student	2.80 (±1.18)	2.79 (±1.09)	0.08	0.94
Managing the behaviour of students with ADHD is easy	3.76 (±1.10)	3.66 (±0.91)	0.65	0.52
I have the skills to deal with children with ADHD in my class	3.08 (±1.08)	2.83 (±1.00)	1.61	0.11
I have the ability to effectively manage students with ADHD	3.06 (±1.18)	2.85 (±1.04)	1.13	0.26
I am limited in the way I manage a child with ADHD	3.01 (±0.96)	3.10 (±1.00)	-0.50	0.62
My school has policies that regulate how teachers manage a child with ADHD	3.28 (±1.02)	3.08 (±1.08)	1.12	0.27
Other staff influence how I would manage a child with ADHD	3.11 (±0.99)	2.96 (±1.06)	0.91	0.37
Parents of students with ADHD influence how I would manage a child with ADHD	3.00 (±1.12)	2.73 (±1.16)	1.62	0.11

Table 4.17 shows the sociodemographic correlates of ADHD knowledge among all the participants. Participants whose previous education included ADHD training (t=2.98, p=0.003) and those who ever requested ADHD evaluation (t=3.33, p=0.001) had higher baseline ADHD knowledge.

Table 4.17: Sociodemographic correlates of baseline knowledge of ADHD among the participants (both intervention and control groups combined)

Variables	Total N =159	SRAQ scores Mean (SD)	t	p
Gender				
Male	16	11.81 (±4.45)		
Female	143	10.78 (±4.14)	0.94	0.35
Type of school				
public school	111	10.57 (±4.34)		
private school	48	11.63 (±3.68)	-1.47	0.14
Religion				
Islam	8	11.75 (±3.96)		
Christianity	151	10.84 (±4.19)	0.60	0.55
Previous training on ADHD				
Yes	43	12.47 (±3.53)		
No	116	10.30 (±4.25)	2.98	**0.003***
Additional training on ADHD				
Yes	24	11.63 (±4.05)		
No	135	10.76 (±4.19)	0.94	0.35
Ever taught pupil with ADHD				
Yes	93	11.78 (±3.35)		
No	66	9.62 (±4.85)	3.33	**0.001***
Ever requested ADHD evaluation				
Yes	20	12.35 (±4.09)		
No	139	10.68 (±4.15)	1.69	0.09
School helpers for ADHD				
Yes	13	12.31 (±3.57)		
No	146	10.76 (±4.20)	1.29	0.20
Qualifications				
NCE	108	10.40 (±4.32)	1.30^{F}	0.27
Degree	40	11.95 (±3.91)		
PGD	4	13.00 (±1.41)		
Grade II	1	12.00		
Masters	6	11.00 (±3.35)		
Classes taught currently				
Nursery class	20	11.25 (±3.97)	1.29^{F}	0.28
Primary 1-3	73	10.32 (±4.10)		
Primary 4-6	66	11.41 (±4.28)		

F: Anova

***Significant at p<0.05**

The statistically significant correlates of less negative attitudes among all the participants were being females (t=2.13, p=0.03) and having schools employ helpers for pupils with ADHD (t=-2.40, p=0.02) (Table 4.18).

Table 4.18: Sociodemographic correlates of baseline attitude scores among all the participants

Variables	Total N = 159	Attitude scores Mean (SD)	t	p
Gender				
Male	16	97.81 (±9.74)		
Female	143	92.67 (±9.07)	2.13	**0.03***
Type of school				
public school	111	93.24 (±9.81)		
private school	48	93.06 (±7.86)	0.11	0.91
Religion				
Islam	8	92.00 (±14.45)		
Christianity	151	93.25 (±8.95)	-0.37	0.71
Previous training on ADHD				
Yes	43	91.72 (±9.18)		
No	116	93.73 (±9.24)	-1.22	0.22
Additional training on ADHD				
Yes	24	95.92 (±8.86)		
No	135	92.70 (±9.26)	1.58	0.11
Ever taught pupil with ADHD				
Yes	93	93.03 (±9.08)		
No	66	93.41 (±9.54)	-0.25	0.80
Ever requested ADHD evaluation				
Yes	20	94.30 (±10.49)		
No	139	93.03 (±9.08)	0.57	0.57
School helpers for ADHD				
Yes	13	87.38 (±8.19)		
No	146	93.71 (±9.18)	-2.40	**0.02***
Qualifications				
NCE	108	94.05 (±9.11)	0.89[F]	0.47
Degree	40	91.40 (±9.17)		
PGD	4	90.50 (±11.56)		
Grade II	1	85.00		
Masters	6	92.83 (±11.36)		
Classes taught currently				
Nursery class	20	91.90 (±12.05)	0.44[F]	0.64
Primary 1-3	73	92.88 (±8.68)		
Primary 4-6	66	93.92 (±8.98)		

Higher scores indicate more negative attitude

F: Anova

***Significant at p<0.05**

Teaching in private schools was the only correlate of higher Knowledge of Behavioural Intervention (t=-3.54, p=0.001) (Table 4.19).

Table 4.19: Sociodemographic correlates of baseline knowledge of behavioural intervention scores among all the participants

Variables	Total N = 159	KBIQ scores Mean (SD)	t	p
Gender				
Male	16	6.00 (±3.16)		
Female	143	6.98 (±2.82)	-1.30	0.20
Type of school				
public school	111	6.37 (±2.92)		
private school	48	8.06 (±2.36)	-3.54	**0.001***
Religion				
Islam	8	6.00 (±2.83)		
Christianity	151	6.93 (±2.87)	-0.89	0.37
Previous training on ADHD				
Yes	43	7.42 (±2.67)		
No	116	6.68 (±2.92)	1.45	0.15
Additional training on ADHD				
Yes	24	6.67 (±3.27)		
No	135	6.92 (±2.80)	-0.40	0.69
Ever taught pupil with ADHD				
Yes	93	7.12 (±2.48)		
No	66	6.55 (±3.32)	1.24	0.22
Ever requested ADHD evaluation				
Yes	20	6.85 (±2.23)		
No	139	6.88 (±2.95)	-0.05	0.96
School helpers for ADHD				
Yes	13	5.54 (±3.02)		
No	146	7.00 (±2.83)	-1.78	0.08
Qualifications				
NCE	108	6.67 (±2.88)		
Degree	40	7.13 (±2.81)		
PGD	4	6.25 (±1.71)		
Grade II	1	10.00		
Masters	6	9.00 (±3.03)	1.40[F]	0.23
Classes taught currently				
Nursery class	20	6.35 (±2.46)		
Primary 1-3	73	6.45 (±3.16)		
Primary 4-6	66	7.52 (±2.54)	2.84 [F]	0.06

F: Anova

***Significant at p<0.05**

There was a statistically significant negative correlation between knowledge scores and age (r = -0.195, p < 0.05); between Knowledge of behavioural intervention and number of pupils in the class (r = -0.275, p < 0.01) and Knowledge of behavioural intervention and number of ADHD workshops attended (r = -0.195, p < 0.05) (Table 4.20).

Table 4.20: Correlation matrix of the continuous sociodemographic variables and the outcome measures

S/N	Variables	1	2	3	4	5	6	7	8
1	Age	____							
2	Teaching experience	**0.63****	_____						
3	Number of pupils in the class	-0.07	-0.02	_____					
4	Number of ADHD workshop attended	0.04	0.14	-0.06	_____				
5	Number of articles read	-0.03	-0.01	-0.02	**0.32****	_____			
6	Knowledge scores	**-0.20***	-0.14	-0.12	-0.02	0.01	_____		
7	Attitude scores	0.03	0.07	0.02	0.08	0.02	-0.04	_____	
8	Behavioural intervention scores	-0.05	-0.10	**-0.28****	**-0.17***	0.01	**0.39****	-0.09	_____

****. Correlation is significant at the 0.01 level (2-tailed)**
***. Correlation is significant at the 0.05 level (2-tailed)**
1:- Age; 2:- Teaching experience; 3:- Number of pupils in the class; 4:- Number of ADHD workshops attended
5:- Number of ADHD articles read; 6:- Knowledge scores; 7:- Attitude scores; 8:- Behavioural intervention scores

SECTION V: Test of treatment effects

Analysis of co-variance (ANCOVA) was performed on the three outcome measures (Tables 4.21, 4.22 and 4.23) to determine the effect of the intervention on improving the knowledge and attitude of participants. The pre intervention scores were entered as covariates and controlled for. Age was also controlled for on knowledge scores and gender on the Attitude scores as these correlated significantly with them. The post intervention scores were used as the dependent variables while the fixed factor was the group.

The effect size of the intervention was also determined using the calculation Cohen's $d = X_1\text{-}X_2/s$ (where = X_1 is the mean post intervention score of the intervention group; X_2 is the mean post intervention score of the control group, and s is the pooled standard deviation of the two groups).

The training programme showed a statistically significant treatment effect on ADHD knowledge {F (1,143) = 38.1, p = 0.000} and explained 21% of the variance in the post intervention ADHD Knowledge scores (See Table 4.21 above) with a large effect size of 0.9.

Table 4.21: Tests of Between-Subjects Effects on the ADHD Knowledge questionnaire

Source	**df**	**F**	**P**	**Partial Eta Squared**
Corrected Model	3	26.85	< 0.001	0.36
Intercept	1	43.54	< 0.001	0.23
Total knowledge Score at Baseline	1	35.67	< 0.001	0.20
Age	1	2.24	.137	0.02
Group	1	38.05	**< 0.001***	0.21
Total	147			
Corrected Total	146			

***Significant at p< 0.05**

The training programme showed a statistically significant treatment effect on the attitude towards ADHD {F (1,143) = 11.0, p = 0.001} and explained 7.1% of the variance in the post intervention Attitude scores as shown on Table 4.22, with a moderate Cohen's effect size (d) of 0.5.

Table 4.22: Tests of Between-Subjects Effects ADHD Attitude items questionnaire

Source	**df**	**F**	**P**	**Partial Eta Squared**
Corrected Model	3	13.13	< 0.001	0.22
Intercept	1	58.54	< 0.001	0.29
Total Attitude Score at Baseline	1	25.03	< 0.001	0.15
Gender	1	1.74	0.19	0.01
Group	1	11.00	**0.001***	0.07
Total	147			
Corrected Total	146			

***Significant at p < 0.05**

The training programme showed a statistically significant treatment effect on the knowledge of behavioural intervention {F (1,143) = 9.5, p = 0.002} and 6.2% of the variance in the post intervention Knowledge of ADHD behavioural intervention questionnaire (Table 4.23) with a moderate Cohen's effect size (d) of 0.6.

Table 4.23: Tests of Between-Subjects Effects Knowledge of ADHD behavioural intervention

Source	df	F	Sig.	Partial Eta Squared
Corrected Model	2	18.42	< 0.001	0.20
Intercept	1	147.94	< 0.001	0.51
Total KBIQ Score At Baseline	1	22.04	. < 0.001	0.13
Group	1	9.50	**0.002***	0.06
Total	147			
Corrected Total	146			

***Significant at p < 0.05**

SECTION VI

This section describes participants' satisfaction with the training programme

The satisfaction scores of participants on the client satisfaction questionnaire ranged from 1 to 5. Higher score indicates agreement with the statement and vice versa (Table 4.24). Higher scores indicate high level of satisfaction with the training program except for the fifth statement where the reverse is the case. Higher score on the statement "I learnt very little from attending the workshop" indicates high level of dissatisfaction with that aspect of the training.

Table 4.24: Intervention group's satisfaction with the training programme

S/N	Items	Mean (SD)
1	The workshop met my expectations	4.09 (0.58)
2	The information was clearly presented	4.35 (0.54)
3	Attending this workshop was valuable	4.36 (0.63)
4	The workshop was held at a convenient time	3.68 (1.01)
5	I learnt very little from attending the workshop	1.89 (0.79)
6	The workshop was held at a convenient place	3.69 (1.17)
7	This workshop has increased my confidence to teach students with ADHD	4.26 (0.81)

Qualitative assessment

Four open-ended questions were asked to assess participants' level of satisfaction with the training programme. These questions were: were there any topics not covered that you would like to see included, what was the best aspect of this workshop, would you change any aspect of this workshop, and any other comments that you would like to make about the workshop.

The topics not covered that participants would like to see included in the workshop

Majority (92.0%) of participants were satisfied with the scope of the topics covered in the training. These participants had no topic that was not covered and their responses were reported as "None" (Table 4.25). Some (8%) however reported that topics such as learning disabilities and truancy should have been included (Table 4.25).

Table 4.25: Emerging themes from participants on topics not covered in the workshop

Themes	N	%
None *'Satisfactory'* *'The topic has been covered'* *'All the topics have been treated'* *'No. Every topic have been covered so I am satisfied with what was presented'*	**69**	**92.0**
Learning disabilities *' 'Learners with disabilities should also be given due considerations'*	**3**	**4.0**
Truancy in schools	**1**	**1.3**
Handicapped children	**2**	**2.7**

The best aspects of this workshop

The best aspects of the training program reported by the participants were varied and included the method of delivery, choice of the topic, the content and the role plays among others (Table 4.26). Three-quarters (75.7%) of the participants reported that they liked the method of delivery while 40.5% of the participants reported that they liked the entire training program. More than a third (39.2%) of the participants liked the fact that the training was repeated (Table 4.26).

Table 4.26: Emerging themes from participants on the best aspect of the workshop

Themes	N	%
Method of delivery *'Use of slides'/'Visual aids'/'The video presentation'/'Visual Aspects'* *'The explanation and the film show'* *'Explanation and contribution by everybody'/'Delivery of the work, class participation and good audience to different views of the participants'/'My comment is about the delivery of the message. Its very interesting and I enjoyed it'/'The interactive session where teachers participated in the activities'/'The best aspect was when the facilitator explained to us the meaning and types of ADHD'/'The demonstration by the participants was also encouraging'* *'It was encouraging and well understood'/'It was well conveyed and well understood'/'Answering of questions by the doctor'*	**56**	**75.7**
Repetition *'Re-enforcement'*	**29**	**39.2**
The entire training programme *'All the aspects of this workshop are good'/'This ADHD workshop is the best'* *'The acquisition of knowledge'/'It was educative and interesting'/'All that was presented in the workshops were good'/'Every aspect is interesting'*	**34**	**40.5**
Use of Handouts *'Handouts to coordinate putting what was learnt into practice'*	**5**	**6.8**
The rich content *'To be able to recognise children with ADHD and manage them in the classroom'* *'It is mostly based on how to manage children in the classroom and how to care for their problems. Also, the workshop enhances an effective management of children with ADHD at all levels'* *'Management of the classroom, organising the classroom, structuring of academic programs and reinforcement'* *'To manage learners with ADHD'* *'The best aspect of this workshop is the aspect of the attitude items for teachers. I have learnt how to handle the children with ADHD'*	**10**	**11.9**
The topic *'The topic itself and the objectives. Anyway, the workshop is very interesting to me as a mother with children and as a classroom teacher'* *'The best aspect of the workshop is finding that there is a medical solution to such child that has ADHD problems. Because a lot of parents do not know that the problems can be solved medically. I the speaker is an example of a parent who didn't believe it can be solved medically because i have a child with such problems. But this workshop has helped me to solve my child's problems'* *'It is necessary for other teachers'*	**7**	**9.5**
Organisation *'To crown it all, it was well organised' 'The workshop was really well organised'*	**5**	**6.8**

Total greater than 74 (100%) because of multiple responses

Aspects of the workshop that participants would like changed

Most of the participants (83.3%) did not have any aspects of the training that they would like to change. The responses of these participants were coded as "None" (Table 4.27). A few (4.8%) felt that more time should have been spent on classroom management strategies training and videos of students with ADHD (Table 4.27).

Table 4.27: Emerging themes from participants on the aspect of the workshop to change

Themes	N	%
None *'None, instead we need more hands to train the teachers and care for the affected students'* *'Well, I cannot change because the workshop is the best of all'* *'Not at all'* *'I will not change any aspect'* *'No, because I have learnt a lot about ADHD'*	**70**	**94.6**
More training on classroom management *'Yes. If there is adequate time, there should be more on the classroom management'*	**1**	**1.4**
Videos *'I would want to see more videos on children and adolescent demonstrations'*	**3**	**4.0**

Participants' comments about the workshop

As shown on Table 4.28, majority of the comments from participants were positive and some suggestions were also made. The participants commented positively on the organisation of the training as well as the content and scope of the training. Suggestions for improvement of the training were given by 58% of the participants. Such suggestions included involvement of parents in training programs, extension of the training to other teachers in other schools and reinforcement of the learning process by repeating the training periodically (Table 4.28).

Table 4.28: Emerging themes from participants on comments on the workshop

Themes	N	%
None *'No comment. You almost covered everything a teacher needs to know about classroom management'/'No comment. They have tried'*	**41**	**48.8**
Very good *'The workshop is well organised. More grease to your elbow'* *'It helps teachers to discover a child with ADHD especially through watching the videos and the aspect of classification of ADHD'* *'It was great'/'Presentation was wonderful'/'Very satisfactory'/'It is satisfactory'* *'It was a wonderful time'/'It is so good to know that there are people who are out to bring about solutions to such problems'/ 'More of this should be done'*	**25**	**33.8**
Parents Should Be Involved *'Here, We Have To Involve Parents To Show Concern'* *'Yes, The Workshop/Training Should Also Involve Parents So As To Have Full Knowledge About ADHD' /'Organise Such Workshop For Parents'* *'It Should Be Taught In Schools And Maybe In Parent-Teachers-Association to help parents also'*	**7**	**9.5**
Interesting *'The workshop is interesting. It encourages me to learn more and care for lower standard children. Thanks'/'The workshop is very interesting'* *'It is interesting. It made me to be more enlightened about the challenges some children have in behaviour disorders. Thank you very much'*	**9**	**12.2**
It should be repeated *'Workshop of this nature should be conducted more often'* *'It should continue from time to time so as to help teachers manage learners with ADHD in their classes'/'The workshop should be organized yearly'* *'Let the workshop be organised every year'/'I will like this workshop to be carried out from time to time in order to encourage teachers to endure children with difficult behaviours'/I want this workshop to be repeated always*	**29**	**39.2**
Educative *'The workshop is very educative and very rich because it will make the teachers to improve in their work for such type of children to be improved for good'* *'It was educative. I learnt a lot and i have no regrets attending the seminar'* *'ADHD seminar is an eye opener and an added knowledge to what I have experienced. I will look forward to an opportunity of using this knowledge I have acquired and God helping me, I will do it with the best of my knowledge. Thanks.'*	**9**	**12.2**
Involvement of other teachers *'Teachers in other schools should be included including private and public schools. Teachers are not aware of ADHD in schools. It makes some teachers to beat the children with ADHD and beating increases the problem'* *'Other teachers in the state should also be trained'*	**7**	**9.5**

Total greater than 74 (100%) because of multiple responses

CHAPTER FIVE

DISCUSSION

This is a quasi experimental study of the effect of ADHD training program on the knowledge and attitude of primary school teachers in Kaduna, North West Nigeria towards this condition. The objectives of the study were to determine the baseline level of ADHD knowledge and attitude, assess the impact of ADHD training program in the intervention group and compare with the control group as well as explore the correlates of baseline level of knowledge and attitude among the primary school teachers. Teachers in the intervention group were trained using the ADHD training program for 3 hours in the first session and 1.5 hours in the second booster session 2 weeks later. The teachers in the control group served as the waiting list controls. The ADHD training program demonstrated a statistically significant increase in knowledge of ADHD and behavioural management, and improvement in attitude in the intervention group compared with the controls. This is further elaborated in this chapter.

Sociodemographic characteristics of participants

The sociodemographic characteristics of primary school teachers in this study are similar to what had been documented in previous studies in Nigeria (Alkahtani, 2013; Ibeziako et al., 2008; Ministry of Education, 2010; National Bureau of Statistics., 2009; Weyandt et al., 2009; Youssef, Hutchinson, & Youssef, 2015). About nine of every ten teachers were women. This is consistent with report from previous studies as well as the demographics of qualified teachers registered with the Teachers Registration Council of Nigeria (Ibeziako et al., 2008; Ministry of Education, 2010; National Bureau of Statistics., 2009). Participants had a mean age of 42.46 years, reported an average of 14.30 years of teaching experience and had a mean number of 37 pupils in their classes. The number of pupils in the classrooms ranged from 15 to 100 and this

finding is in keeping with documented findings (Tahir, 2001). In Nigeria, teacher allocation is considered inequitable, exhibits significant variations within and across states and pupil-teacher ratios ranging from less than 30 to up to 70 (World Bank, 2003).

Majority of the teachers had Nigerian Certificate in Education (NCE) while a quarter had a bachelor's degree. This could be because the minimum qualification for employment as a primary school teacher is NCE. It is probable that individuals with higher qualifications will tend to seek employment in secondary schools and may only stay in primary schools if that is the only available employment. The NCE has become the minimum qualification for primary school teaching as from 1988 and this came about in an attempt to create uniformity of standard (Teboho, 2000). Meanwhile the bachelor's degree is the teaching qualification required at senior secondary schools (Teboho, 2000). About three of every ten participants reported that their previous training included training on ADHD. This is surprising and inadequate as research has documented that there is approximately 1 child in every classroom with a diagnosis of ADHD (Fabiano & Pelham, 2003; Kos et al., 2006). Furthermore, more than half of the teachers in this present study actually reported ever teaching a pupil with ADHD. However, several challenges have been identified in the Nigerian education system. For example, issues such as the poor quality of the training provided at the colleges of education responsible for training teachers (Teboho, 2000). Also, the outdated training methods and approaches do not take into consideration the changes taking place in the teaching environment. In addition, teachers in service as well as those in administration do not have sufficient opportunities for further development (Teboho, 2000). This is supported by the findings in the present study where less than a fifth of the participants had additional training on ADHD in spite of mean 14.30 years of

teaching experience reported by the same population.

More than two-thirds of the participants taught in public schools versus less than a third in private schools. Since the selection of the number of private and public schools sampled was based on probability-proportional-to size (PPS) calculation using the teacher population as the basis, this could therefore be taken as an indicator that there are more teachers in the public schools than the private schools. This finding has support from the Kaduna state school census report which revealed that the population base of teachers in the public schools was 36, 492 and 19,283 in the private schools (Ministry of Education, 2010). Thus, the study sample appears to adequately represent the targeted population of primary school teachers.

Participants' knowledge and attitude towards ADHD at baseline

About four of every ten participants had knowledge of ADHD. However, this is within the range of findings from previous studies from developing and developed countries (Jimoh, 2014; Kleynhans, 2005; Murray, 2009; Perold, Louw, & Kleynhans, 2010; Sciutto et al., 2000). The level of knowledge of ADHD among teachers has been reported to range between 17% to 77% depending on the location, the methodology, the instruments, the participants' professional qualification, classes being taught, whether participants are trainees, primary or secondary school teachers, age of study participants as well as whether the participants were general teachers or special education teachers. Jimoh (2014) carried out a cross-sectional study among 250 teachers from 10 public and 10 private schools in Lagos, Nigeria and reported deficiencies in teachers' knowledge as well as negative attitudes to pupils with ADHD. She reported the mean score on

knowledge of ADHD as 23.44 and on attitude as 42.26. However, the instruments used for the study were developed by the researcher for the study and therefore the psychometric properties are not known. Also, the scoring methods were not included in the article.

Perold and colleagues reported a knowledge level that is comparable with what was reported in the current study (42.6% Versus 40.3%) (Perold et al., 2010). These researchers conducted their study on a group of 552 educators situated in the peripheral areas of the Cape Town Metropole in the South Africa. They used KADDS scale, which showed that within the South African context, educators do not have adequate understanding of ADHD. The difference between the two studies may be attributed partly to the instruments used (i.e. KADDS versus Knowledge of ADHD questionnaire). Murray (2009), in her own study, reported a knowledge level of 48% among 71 pre service and in service teachers which is also higher than the 40.3% obtained in this present study. Their study was conducted in Murdoch, Western Australia. The variation in the Murray study compared to the current study may be due to varying methodological factors. Firstly, although similar instruments were used in both studies, her study also included pre service teachers while this present study involved only in service teachers. Secondly, the studies were conducted in different settings. Murray conducted her study in a developed country where level of knowledge of ADHD may be higher while this present study was conducted in a developing country. Thirdly, the sample size was small in the Murray study compared with the sample size of 159 in service teachers in this present study.

The level of knowledge of 40.3% in this study is higher than the 17.2% reported by Alkhatani (2013) in her study conducted among 431 preschool to ninth grade teachers in Riyadh, Saudi Arabia. The scope of her study is also similar to the present study which examined preschool

teachers to primary six teachers. The age range of participants in both studies was also similar (23 to 59 years versus 22 to 60 years). However, the study location as well as the study instrument differed. KADDS was used by Alkhatani although this instrument uses the same scoring method of true, false and don't know as the knowledge of ADHD questionnaire used in this present study and both are derived from same parent instrument. Furthermore, Alkhatani (2013) recorded a low response rate (21.45%) which may limit the generalizability of the results. The exact reasons for these low scores are not clear, but the data do suggest that a lack of education may be critical.

The high level of negative attitude towards pupils with ADHD by the teachers found in the current study is similar to previous studies conducted in Lagos, which is in South Western part of the Nigeria (Adeosun et al., 2013; Jimoh, 2014) as well as other developing countries (Ghanizadeh et al., 2006; Perold et al., 2010). Jimoh (2014) reported findings of negative attitudes to pupils with ADHD among the 250 teachers in her study. She reported the mean score on attitude as 42.26. However, as already pointed out, the instruments used for the study were developed by the researcher for the study and therefore the psychometric properties are not known. Also, the scoring methods were not included in the article. Similarly, Adeosun et al (2013) reported negative attitudes towards pupils with ADHD among 144 primary school teachers that were examined from four mainstream schools, also in Lagos.

The finding of negative attitudes in this present study is in contrast to documented findings from developed countries (Youssef et al., 2015). In their study of 277 primary and secondary school

teachers in Trinidad and Tobago, Youssef et al. (2015) found that attitudes toward children with ADHD were generally positive. Although their study utilized a large sample size and a similar Attitude questionnaire as this present study, the questionnaire was modified to 25 questions from its original 30 questions and the sample included secondary school teachers. This is in contrast to the present study which administered the entire 30 questions in the questionnaire and studied only primary school teachers. In addition, convenience sampling was utilized by Youssef et al. (2015) while multi-staged stratified random sampling technique was utilized in this present study. Youssef et al. (2015) conducted their study in Trinidad and Tobago which, although a developing state like the location of the present study, is the richest state in the Caribbean Island. As such, it is highly influenced by global culture and in particular, the North American culture to which it is in close proximity. These factors could account for the awareness and positive attitude found in their study. The negative attitude found in the present study could be an extension of discriminatory attitudes that still exist with respect to mental and neurological illnesses (Ukpong and Abasiubong, 2010).

The level of knowledge of behavioural intervention of 57.3% found in this study indicates good knowledge among the participants. The literature search revealed a dearth of study on this. However, Kos (2004), in her thesis, assessed the behaviour management strategies used by primary school teachers in the classroom to manage students with ADHD. The teachers were required to tick, from a list, strategies they will apply to children in clinical vignettes presented to them. She found that no teacher reported that they intended to do nothing about the disruptive behaviours of the students with ADHD. Also, the participants were able to accurately label the strategies that they used. This could be taken as an indication of good knowledge of behavioural

intervention. Direct comparison might be limited by the use of different instruments in the two studies. The instrument used in this present study was designed for the study by the supervisor therefore the psychometric properties are not known. However, it was piloted among a sample of teachers similar to the final study sample and no difficulties were encountered. The finding of good knowledge of behavioural intervention among the participants may be attributable to exposure of participants to classroom management strategies as a course in the teacher training colleges.

Outcome of the intervention

The ADHD training program used in the present study was adapted from the MhGAP-IG and the training resulted in significant improvement in level of knowledge as well as more positive attitudes in the intervention group compared with the controls on all outcome measures. In addition, there was a significant reduction in the percentage scores on don't know responses (gaps in the knowledge) post intervention in the intervention group compared with the reductions observed in the incorrect responses (misperception) on the knowledge scales. This could be because misperceptions are more resistant to change (Sciutto et al., 2000) while it is often easier to educate persons who do not have incorrect preconceived ideas about a subject (Youssef et al., 2015). There was a high response rate in the present study with 89.3% in the intervention group and 93.4% in the controls. This can probably be ascribed to the involvement of the headmasters/mistresses, some of the research officers in the local government areas and in one situation, the district education officer.

There is a dearth of study on the impact of ADHD training programmes for teachers in developing countries. The few studies available reported significant increase in the knowledge of teachers post intervention which is in keeping with the findings of the present study. Even non-attendance education method, one point training, short-term interventions (1 week), as well as web-based ones have been shown to rapidly improve knowledge about ADHD, with benefits lasting for at least 6 months (Aguiar et al., 2014; Barnett, Corkum, & Elik, 2012).

One of such studies comparing the effect of non-attendance education method with workshop education method on teachers' knowledge, attitude, and function towards students with ADHD was a study by Sarraf et al. (2011) of 67 primary school teachers in Isfahan, in Iran. The workshop education group had two days of education while the non-attendance education group was given related booklets to study with the precise educational content similar to that of the workshop education group. Post-test questionnaires were given to the workshop group after the two days of education while they were given to the non-attendance group who had studied the related booklets after ten days. They found that both non-attendance education method and workshop education method were effective in promoting teachers' knowledge but workshop education was more effective in attitude change and promotion of teachers' knowledge of function about dealing with ADHD students. However, the study lacked a control group that did not receive any training.

Murray (2009) trained 28 pre-service teachers using the ADHD intervention program designed by the author in a three-hour program (equivalent to the time allocated for a lecture and tutorial in that setting). Post-intervention measures were collected immediately after the training and 2

weeks after using Self-report ADHD questionnaires for teachers (same instrument as was used in this present study). She found that there were statistically significant increases in ADHD knowledge scores across the 3 testing times. There were significant differences between pre-test and post-test scores and between pre-test and follow-up scores but no significant difference between post-test and follow-up scores.

Syed (2010) studied the impact of a two-hour per day, week-long teachers' training program on their knowledge of ADHD across three schools in various areas of Karachi, Pakistani. Forty-nine (49) female teachers participated in the study and the training program for ADHD was designed by the authors. They filled a sociodemographic and an ADHD knowledge questionnaire before and after the training. Mean scores on the teachers' knowledge questionnaires pre and post intervention were compared using paired t-test. The authors also found that the training improved the knowledge of the school teachers about ADHD and this remained significant at 6 months post-training.

Similarly, intervention studies on attitudes towards ADHD are also few but they reported improvement in attitude following the intervention programmes. One of these study was carried out by Sarraf et al. (2011) and they found that workshop education was more effective in attitude change compared with non-attendance education method. Another one was by Murray (2009) and she also reported improvement in teachers' attitude post training although this was only significant on one of the seven factors on the ADHD attitude scale. The significant differences were between pre-test and post-test and between pre-test and follow-up but no significant difference between post-test and follow-up scores. The mean scores on three other factors also

showed trends in the expected direction of improved attitudes even though these did not reach statistical significance. Also, the few intervention studies on knowledge of behavioural management reported increase in knowledge following the intervention programmes. Sarraf et al. (2011) found that their workshop education method of two days improved teachers' knowledge about dealing with ADHD students.

Satisfaction with the Training Programme

Teachers' satisfaction with the training programme was very good as the mean scores on most of the items on the client satisfaction measures was greater than 4 out of 5. Also, the mean score on the statement that they learnt very little from the workshop was low which means that they did not agree with the statement. The lowest scores were on the convenience of the venue and time of the training. This is not surprising as the training had to be conducted during the school hours and the recess time utilized. At the end of the training, the teachers had to go back to the classes to round up for the day. Thus the timing might have put some pressure on the participants. Also, venue of the training was either the library or the classrooms and the chairs used were either benches or the pupils' chairs which were not very conducive for adults. Having to use venues outside the school would have resulted in high attrition rate. Conducting the study in the school premises placed the attendance of the teachers who volunteered under the supervision of the headmistresses/headmasters. This may also explain the high response rate recorded in this study. Most of the participants were happy with the scope of the topic, the duration and the fact that it was repeated. A few participants suggested that learning disabilities and truancy should have been included. Many participants said that what they liked was the interactivity of the sessions, receptivity of the facilitator and the role plays by the participants.

Limitations

The duration of the intervention was short comprising of a 3-hour session followed after two weeks by a 1.5 hour booster training and this is due to time constraints of the Masters program. Also, the participants were randomised at school level rather than as individuals. The latter would have been ideal but would have been impractical. In addition, the outcome measures were self completed – so socially desirable responding pattern could have contributed to the better outcomes among the intervention group. Finally, the study used a wait list control group (rather than an active control group). Trials tend to show higher outcomes when wait list controls are used.

CONCLUSIONS

Primary school teachers in Kaduna had poor knowledge of ADHD as well as negative attitudes towards pupils with ADHD. However, ADHD training had a significant impact in improving both attributes in this study. Teachers whose previous education included training on ADHD had higher scores on knowledge at baseline. The participants were highly satisfied with the programme, expressed a wish for the programme to be repeated on yearly basis and extended to all the schools in the state so that other teachers can also benefit.

Thus, consideration should be given to the integration of ADHD training programs into teacher training programs and organisation of additional workshops as refresher courses.

RECOMMENDATIONS

1. The inclusion of ADHD training programs into the teacher training curriculum, to meet the goals of inclusive education, should be considered by the Ministry of Education in collaboration with mental health professionals.
2. In service training on ADHD should be incorporated into the educational system as this study, similar to other studies (Niznik, 2005), has shown that teachers' knowledge improve as a result of training programs.
3. School counsellors, trained to help children with ADHD, should be available in primary schools as teachers who had access to professional help in the management of such children had better attitudes towards ADHD.

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APPENDIX 1

Effect of attention-deficit-hyperactivity-disorder training program on the knowledge and attitude of primary school teachers in Kaduna, North West Nigeria

SOCIODEMOGRAPHIC QUESTIONNAIRE

SERIAL NO: _____

1. Gender : Male ☐ Female ☐
2. Age: _____
3. Religion: _____
4. Ethnicity: _____
5. Qualifications obtained: _____
6. Number of years of teaching: _____
7. Class currently being taught: _____
8. Number of pupils in the class: _____
9. Classes taught in the past: _____
10. Did your previous education/training involve information about ADHD? Yes ☐ ☐
11. Have you ever engaged in additional training regarding ADHD during your teaching career? **Yes** ☐ **No** ☐
12. How many workshops on ADHD have you ever attended? _____
13. How many hours of ADHD training have you had? _____
14. How many articles on ADHD have you read? _____
15. Have you ever taught a pupil with ADHD? Yes ☐ No ☐
16. If yes to Number 15,
    a. How many students with ADHD have you taught in the past? _____

b. When was the last time you taught a student with ADHD? _____

c. How many of these students were on drugs for ADHD? _____

d. Did you have contact with the prescribing doctor? _____

e. Has feedback been requested regarding a child with ADHD? _____

17. Have you ever taught any pupil that you feel should have a diagnosis of ADHD but did not? Yes ☐ No ☐

18. If yes to Number 17, how many pupils? _____

19. Have you ever requested for ADHD evaluations for a pupil? Yes ☐ No ☐

20. If yes to Number 19, how many? _____

21. Does your school employ people specifically to help pupils with ADHD? Yes ☐ No ☐

22. How much do you think you know about ADHD? Please indicate on this rule:

Very little0cm_____25cm_____50cm_____75cm_____100cma lot

23. How confident are you to teach a child with ADHD? a) Not at all confident ☐

b) Quite confident ☐ c) Confident ☐ d) Very confident ☐

APPENDIX 2

Self report ADHD Knowledge Questionnaire (SRAQ)

SN	QUESTIONS	TRUE	FALSE	DON'T KNOW
1	There are a greater number of boys than girls with ADHD			
2	There is approximately 1 child in every classroom with a diagnosis of ADHD			
3	If medication is prescribed, educational interventions are often unnecessary			
4	Children with ADHD are born with biological vulnerabilities towards inattention and poor self control			
5	If a child responds to stimulant medication (e.g., Ritalin) then they probably have ADHD			
6	A child who is not over-active, but fails to pay attention, may have ADHD			
7	ADHD is often caused by food additives			
8	ADHD can be diagnosed in the doctor's clinic most of the time without information from school			
9	Children with ADHD always need a quiet environment to concentrate			
***10**	Approximately 5% of Nigerian school-aged children have ADHD			
11	Children with ADHD are usually from single parent families			
12	Diets are usually not helpful in treating most children with ADHD			
13	ADHD can be inherited			
14	Medication is a cure for ADHD			
15	All children with ADHD are over-active			
16	There are subtypes of ADHD			
17	ADHD affects male children only			
18	The cause of ADHD is unknown			
19	ADHD is the result of poor parenting practices			
***20**	If a child can play Nintendo for hours, than s/he probably doesn't have ADHD			
21	Children with ADHD cannot sit still long enough to pay attention			
22	ADHD is caused by too much sugar in the diet			
23	Family dysfunction may increase the likelihood that a child will be diagnosed with ADHD			
24	Children from any walk of life can have ADHD			
25	Children with ADHD usually have good peer relations because of their outgoing nature			
26	Research has shown that prolonged use of stimulant medications leads to increased addiction (i.e., drug, alcohol) in adulthood			
27	Children with ADHD generally display an inflexible adherence to specific routines and rituals			

APPENDIX 3

ADHD Attitude Scale

SN		Strongly disagree	Disagree	Not sure	Agree	Strongly agree
1	ADHD is a valid diagnosis					
2	ADHD is an excuse for children to misbehave					
3	ADHD is diagnosed too often					
4	ADHD is a behavioural disorder that should not be treated with medication					
5	All children with ADHD should take medication					
6	Medications such as Ritalin and Dexamphetamine should only be used as a last resort					
7	ADHD is a legitimate educational problem					
8	Having a child with ADHD in my class would disrupt my teaching					
9	I would feel frustrated having to teach a child with ADHD					
10	Young children with ADHD should be treated more leniently than older children with ADHD					
11	Children with ADHD should be taught by special education teachers					
12	I would prefer to teach a student who was over-active than one who was inattentive					
13	Most students with ADHD do not really disrupt classes that much					
14	Children with ADHD should not be taught in the regular school system					
15	The extra time teachers spend with students with ADHD is at the expense of students without ADHD					
16	Other students do not learn as well as they should when there is a child with ADHD in the class					
17	You cannot expect as much from a child with ADHD as you can from other children					
18	Children with ADHD could control their behaviour if they really wanted to					
19	Children with ADHD misbehave because they are naughty					
20	Children with ADHD cannot change the way they behave					
21	Students with ADHD could do better if only they ’ d try harder					
22	Children with ADHD misbehave because they don ’ t like following rules					

23	Students with ADHD are just as difficult to manage in the classroom as any student					
24	Managing the behaviour of students with ADHD is easy					
25	I have the skills to deal with children with ADHD in my class					
26	I have the ability to effectively manage students with ADHD					
27	I am limited in the way I manage a child with ADHD					
28	My school has policies that regulate how teachers manage a child with ADHD					
29	Other staff influence how I would manage a child with ADHD					
30	Parents of students with ADHD influence how I would manage a child with ADHD					

APPENDIX 4

Knowledge of Behavioural Intervention for ADHD for Teachers (KBIQ)

SN	QUESTIONS	TRUE	FALSE	DON'T KNOW
1	The position where a child with ADHD sits in the classroom does not really affect their behaviour or learning as long as they feel comfortable			
2	A child with ADHD is likely to work better when paired to work with one other student than in larger groups of children			
3	Children with ADHD don't usually have problem with moving from one classroom activity to another activity			
4	Children with ADHD may need extra breaks if a classroom activity requires lengthy periods of sitting			
5	Punishing children with ADHD for bad behaviour is more effective in changing their behaviour than rewarding them for good behaviour			
6	It is better to delay punishing a child with ADHD for two days after the bad behaviour as this allows the child to think of what they did wrong			
7	Ignoring minor misbehavior of a child with ADHD can help to better manage their behaviour in the classroom			
8	Children with ADHD need more monitoring during less structured times such as break times			
9	Corporal punishment such as beating a child with stick is the best method for teachers to improve the behaviour of children with ADHD because these children are very difficult to manage			
10	Having non-academic pogrammes such as Physical Education in the morning and having academic subjects such as Mathematics in the afternoon is better for children with ADHD as they are more alert in the afternoon			
11	Using colourful and stimulating teaching material is good for other children but not for children with ADHD as it can make them too excited			
12	Frequent praise for a child with ADHD is not good for them as they become "bid-headed" and start behaving badly			

APPENDIX 5

CLIENT SATISFACTION QUESTIONNAIRE

Serial No: _____

	SA	AGREE	AVERAGE	DISAGREE	SD
1. The workshop met my expectations					
2. The information was clearly presented					
3. Attending this workshop was valuable					
4. The workshop was held at a convenient time					
5. I learnt very little from attending the workshop					
6. The workshop was held at a convenient place					
7. This workshop has increased my confidence to teach students with ADHD					

8. Were there any topics not covered that you would have liked to see included?

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9. **What was the best aspect of this workshop?**

10. **Would you change any aspect of this workshop?**

Are there any other comments that you would like to make about this workshop?

APPENDIX 6

THREE MONTHS WORKSHOP EVALUATION QUESTIONNAIRE

Serial No: _____

	SA	AGREE	AVERAGE	DISAGREE	SD
11. The strategies I learned about have been very useful to me in my classroom					
12. Students' behaviour has improved as a result of my use of these strategies					
13. The strategies are too difficult to implement in the classroom					
14. These strategies are not helpful as a means of improving student's behaviour					
15. I have not had time to try any of the strategies covered in the workshop					
16. I intend to keep using the strategies in the future					

17. Which strategies have you used in your classroom over the past 3 months to manage the behaviour of a student?

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18. Which strategy have you used most often?

19. Which strategy has been the most helpful?

20. Which strategy(s) do you intend to use in the future?