

Full Length Research Paper

Children and adolescents with Attention Deficit/Hyperactivity Disorder (ADHD) in the Eastern Cape, South Africa: Aetiology, diagnosis and treatment

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The aim of the study was to investigate the aetiology, diagnosis and treatment of children and adolescents diagnosed with Attention Deficit/Hyperactivity Disorder (ADHD) in the Eastern Cape Province of South Africa. A questionnaire survey was conducted in 2007. A stratified random sample of pharmacies was selected. Fifty-four pharmacies indicated their willingness to participate in the study. Questionnaires were distributed by responsible pharmacists to parents of children diagnosed with ADHD. A total of 51 questionnaires were analysed. The average age of patients was 10.27 (SD = 2.54) years (73.58% of patients were males). Nearly 30% of the mothers indicated that the pregnancy or birth was difficult. The diagnosis of ADHD formally occurred at an average age of 6.24 (SD = 2.08) years. The majority of patients were diagnosed by paediatricians (51.57%), followed by psychiatrists (23.33%). Seventeen patients had family members diagnosed with ADHD (including cousins and siblings). Methylphenidate was the most commonly prescribed medication for ADHD. Forty-two parents indicated that their children lost their appetite after the initiation of the medication. Alternative treatments were used by 21.57% of children. From this study, it was clear that ADHD has a hereditary component. Further studies are needed, especially focussing on drug holidays and alternative treatments for ADHD.

Key words: Attention deficit/hyperactivity disorder (ADHD), methylphenidate, South Africa, co-morbid conditions, alternative treatments.

INTRODUCTION

Attention Deficit/Hyperactivity Disorder (ADHD) is a syndrome of developmentally inappropriate and socially disruptive behaviour beginning in childhood and is characterised by varying degrees of hyperactivity, inattention and impulsiveness (Martindale, 2005). Diagnosis in South Africa is made using Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria (Biederman and Faraone, 2005). ADHD was the first psychiatric disorder to be diagnosed and treated in the youth (Biederman and Faraone, 2005; Silver, 1992; Wilens et al., 2002). Studies of stimulant

use dates back to 1937 and the approval of the use of stimulant therapy for the treatment of ADHD was achieved in the 1960s (Biederman and Faraone, 2005).

The exact incidence of ADHD in South Africa is not known. Biederman and Faraone (2005) quoted the incidence of ADHD to be between 8 and 12% of children worldwide, and Meyer et al. (2004) estimated the incidence of ADHD to be between 3 and 10% in the child population in Europe and the USA. The reason for these differences in incidence rates can be due to a greater understanding in recent years between certain co-morbidities, such as anxiety, depression, Tourette's syndrome and oppositional defiant disorder (ODD), with the presence of ADHD (Biederman and Faraone, 2005; Coolidge et al., 2000; Faraone et al., 2005a).

The difference in the prevalence rates of ADHD

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between the two gender groups can possibly be due to the disorder being less disruptive in females than in males (Biederman and Faraone, 2005; Silver, 1992; Quinn and Wigal, 2004). However, the diagnosis of ADHD in females can result in more severe outcomes (Meyer et al., 2004). Females tend to be diagnosed more often with the predominantly inattentive subtype of ADHD and may therefore not be recognised in the community setting (Meyer et al., 2004; Quinn and Wigal, 2004). Studies have indicated that the major aetiological factor is genetic (Faraone et al., 2005b), probably mainly expressed as alterations in catecholaminergic regulation of brain activity. ADHD places the child at risk for school failure and dropout, juvenile delinquency, criminality, substance abuse, and sexual promiscuity with HIV/AIDS and teenage pregnancies as possible consequences (Aase et al., 2006). The disorder is costly, both to patients, families and society.

Methylphenidate is the treatment of choice for ADHD, however negative publicity in the 1980s resulted in many parents fearing the adverse effects of this psychostimulant (Biederman and Spencer, 2000; Brownell et al., 2006; Carboni and Silvagni, 2004; Faraone, 2005; Silver, 1992). Methylphenidate, however, remains one of the best-studied medications used in modern medicine (Wilens, 2004). The effectiveness and safety of methylphenidate have been studied in more than 250 controlled studies which assessed more than 5,000 patients (Buck, 2002; Silver, 1992). Psychostimulants have been used to treat hyperactivity and distractibility for more than 50 years (Buck, 2002; Silver, 1992). The rapid increase of stimulant use among children in the 1990s has raised global concern about the use of stimulants (Faber et al., 2010). The introduction of atomoxetine as a non-stimulant treatment for ADHD has increased the available treatment options, yet data on its effect on drug usage patterns are scarce (Van den Ban et al., 2010).

Little published information exists about the incidence and treatment of ADHD in South Africa. Since ADHD has an effect not only on the child, adolescent or patient, but also on family members and the schooling system, this study was conducted to cast more light on this disease state in South Africa. The primary aim of this study was therefore to investigate the aetiology, diagnosis and treatment of children and adolescents diagnosed with ADHD in the Eastern Cape Province of South Africa.

MATERIALS AND METHODS

Information on the aetiology, diagnosis and treatment methods of ADHD is limited in South Africa. A questionnaire was designed that contained questions on the demographic details, family history, diagnosis, treatment and possible effects of medication on children and adolescents who received medication for ADHD. The questionnaire was piloted and minor improvements were made. It was thereafter distributed by community (or retail) pharmacies to parents of children who received their medication for ADHD from

those pharmacies.

A total of 192 community pharmacies in the Eastern Cape were registered with the South African Pharmacy Council during March, 2006. A stratified random sample was drawn and 94 pharmacies were telephonically contacted. Fifty-four responsible pharmacists indicated that they were willing to participate in the study. The questionnaires were personally delivered during November, 2006 to each responsible pharmacist. The questionnaire was accompanied by a letter to parents explaining the study and a self-addressed envelope to enable the questionnaire to be returned. Consent forms were completed by each responsible pharmacist. Follow-up telephone calls to serve as reminders were made to the responsible pharmacists during January, 2007.

A total of 51 questionnaires were returned (response rate of 9.77%). A limitation of the study was that questionnaires were distributed just prior to the summer school holiday which could have negatively affected the response rate (since families may have gone away on holiday or could have focussed less on their child's medication during the holiday and have therefore forgotten to complete the questionnaire). Proof for this was that most questionnaires were only returned in 2007 after the schools have re-opened. Microsoft Excel[®] and Access[®] were used for data analysis. Descriptive and inferential statistics were calculated. Ethical approval for the study was obtained from the Research Ethics Committee (Human) of the Nelson Mandela Metropolitan University.

RESULTS

Demographic information

The majority of patients were males (73.58%). A chi-square test of independence indicated a significant difference regarding the gender distribution in this population ($\chi^2_{(1)} = 22.24$, $p < 0.0005$, $V = 0.47$). The majority of patients (78.43%) resided in Port Elizabeth (a metropolitan area), followed by Queenstown, St Francis Bay and East London. Approximately three-quarters of patients (78.43%) were white. The other two main population groups were coloured and black, each representing 5.88% of the population. Five respondents (9.80%) did not indicate race.

Age, height and weight of children and adolescents

The average age of patients was 10.27 (SD = 2.54) years [the average age of boys was 10.26 (SD = 2.51) years and of girls 10.33 (SD = 2.39) years]. The average weight of patients was 41.59 (SD = 15.82) kg and the average height was 143.82 (SD = 23.17) cm. Patients were on ADHD medication for an average of 2.82 (SD = 2.10) years.

Parents

The average age of the parents when their child was born was 30.84 (SD = 5.73) years for the fathers and 28.29 (SD = 4.52) years for the mothers. The age of the

mothers at the birth of their children ranged from 20 to 42 years. Fourteen respondents (27.45%) indicated that the mother had a difficult pregnancy or birth with her child diagnosed with ADHD. The most important reasons given for perceiving the pregnancy or birth as difficult included long labour, emergency caesarean section and instruments used during delivery.

Diagnostic process

Respondents noted that they suspected their child to have ADHD at the average age of 5.26 (SD = 2.11) years (range: shortly after birth to 13 years). Patients in the study were diagnosed with ADHD at an average age of 6.24 (SD = 2.08) years (range: nine months to 13 years). Most of the diagnoses occurred between the ages of five and eight years, which is the time when most children start attending formal education facilities, such as pre-primary and primary school in South Africa. Males were suspected of having ADHD at an average age of 5.24 (SD = 2.23) years and the formal ADHD diagnosis was made at an average age of 6.24 (SD = 2.10) years. Females, similarly, were first suspected of having ADHD at an average age of 5.39 (SD = 2.23) years and the ADHD diagnosis was made at an average of 6.73 (SD = 2.04) years.

Thirty-two (62.75%) respondents were first made aware of a behavioural problem in their child by the child's teacher, while 16 parents suspected a problem in behaviour with their child themselves. The majority (51.57%) of patients were originally diagnosed by paediatricians, followed by psychiatrists (23.33%). Most of the children or adolescents (68.63%) consulted other health care professionals to assist in the treatment of ADHD. Of the children or adolescents who consulted with health care professionals other than the diagnosing doctor, 12 continued to consult them. Other health care professionals included occupational therapists (40.74%), psychologists (27.78%) and physiotherapists (7.41%).

Family history of psychiatric disorders

Six children or adolescents had parents diagnosed with, or suspected of having, ADHD as a child. Two mothers and five fathers had previously been diagnosed with ADHD. Furthermore, 17 of the children and adolescents had 21 family members previously diagnosed with ADHD. Figure 1 indicates which family members were previously diagnosed with ADHD. Ten parents indicated that they were on chronic medication for a psychiatric disorder (nine mothers and one father were receiving medication for predominantly depression). The average age when the diagnosis of the psychiatric disorder occurred was 31.89 (SD = 4.65) years. Nine parents were receiving antidepressants and one was receiving methylphenidate.

The two most commonly prescribed antidepressants were fluoxetine and citalopram.

Medication history

The average age at which treatment for ADHD was initiated was 11.29 (SD = 5.08) years (the average age of females was 11.03 (SD = 5.93) years and of males 11.35 (SD = 4.81) years). Almost all patients (96.08%) were initiated on methylphenidate after their original diagnosis. The remaining two patients were initiated on atomoxetine.

The most commonly prescribed methylphenidate-containing product was Ritalin[®] prescribed to 74.51% of patients at the original diagnosis (Figure 2). Patients were originally prescribed an average of 15.63 (SD = 6.33) mg methylphenidate per day. The majority (52.94%) of patients on methylphenidate took their medication in divided doses and the most common dosage instruction was to take the medication twice daily. It was indicated that the patients were on this original treatment for an average of 16.70 (SD = 16.00) months.

Three quarters of patients (76.47%) underwent a dosage or medication change after the original diagnosis of ADHD. Since methylphenidate dosages are titrated upwards after initiation of therapy, dosage increases were to be expected. Forty-one patients (80.39%) were on a methylphenidate-containing product after a dosage or medication change occurred. Two patients were receiving two products in order to control their ADHD symptoms after the dosage or medication change. The average dose of methylphenidate patients received after a dosage or medication change was 26.68 (SD = 10.63) mg per day. This was an average increase of 11.05 mg methylphenidate per day when compared to the initial starting dose. Figure 3 indicates the trade name products patients were prescribed after a dosage or medication change.

After the dosage or medication change, 27 respondents (52.94%) were of the opinion that the change in dosage or medication improved symptom control in their child or adolescent. Reasons given for perceiving a positive change in symptom control was that the patient's concentration improved (53.33%) and that the patient was calmer (10.00%). Forty-two parents indicated that their children lost their appetite after the initiation of medication, but only 11 indicated that their children had lost weight since initiating medication. Twenty-seven patients (52.94%) went on structured medication-free ("drug holiday") periods over weekends, while 30 patients (58.82%) went on these structured medication-free periods during school holidays. Twelve patients (23.53%) went on structured medication-free periods "sometimes" during weekends and school holidays. Figure 4 indicates the changes respondents noted in their children during these structured medication-free periods.

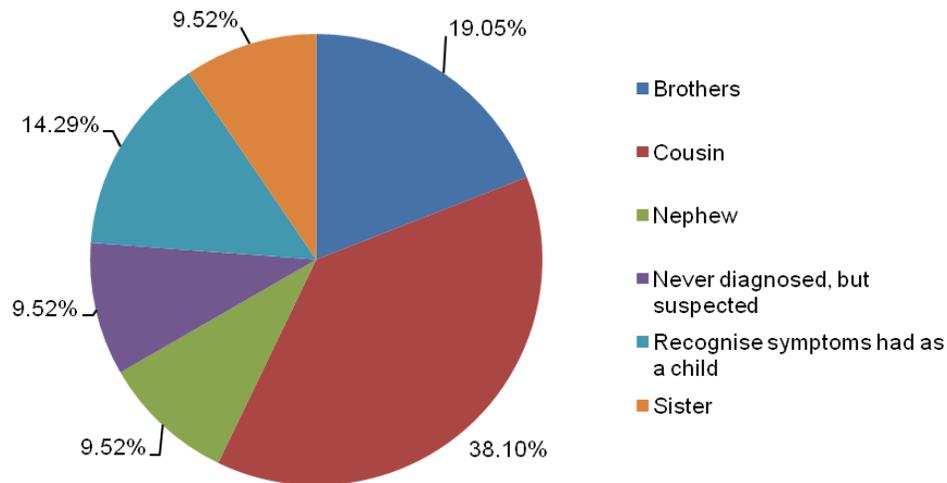


Figure 1. Attention deficit/hyperactivity disorder diagnosis in other family members (n = 21).

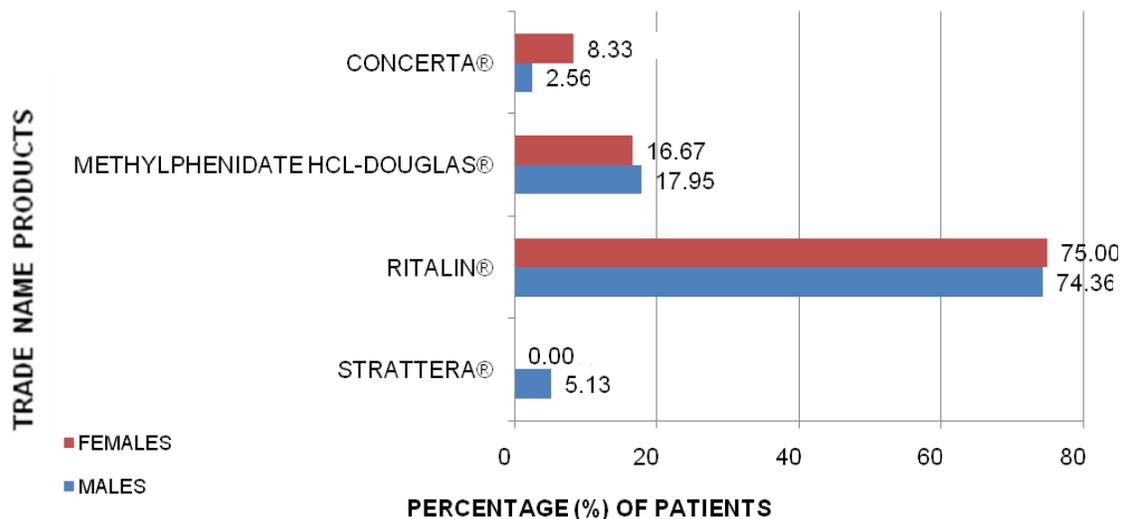


Figure 2. Trade name products prescribed to patients at the original diagnosis of attention deficit/hyperactivity disorder ($n_{\text{males}} = 39$ and $n_{\text{females}} = 12$)*. *Manufacturers: Concerta® (Janssen), Methylphenidate-Douglas® (Pharmaplan), Ritalin® (Novartis), Strattera® (Eli Lilly).

Alternative products and/or treatments

Thirty-four respondents (66.67%) indicated that the child or adolescent had tried alternative treatments (for example, dietary modifications, supplements or natural products, and/or behavioural therapy). The children and adolescents took alternative treatments on average for 20.65 (SD = 25.26) months. Only 21.57% of patients were still taking alternative treatments at the time of the study and 17.65% of respondents indicated that there was a change in symptoms while using alternative treatments. Respondents indicated that the most notable change was seen when the alternative therapy was used in combination with pharmacological treatment.

DISCUSSION

Parents, teachers and children need to be educated about ADHD, its treatment and care. The findings of this study were generally in agreement with the literature regarding ADHD and its treatment. The majority of patients were male, which is in agreement with the literature which states that ADHD is diagnosed up to nine times more often in males than in females (Biederman and Faraone, 2005; Wilens et al., 2002; Meyer et al., 2004; Quinn and Wigal, 2004; Cyr and Brown, 1998; Hall and Gushee, 2000). The average weight and height of patients were compared to the Centers for Disease Control (CDC) paediatric growth charts (50th percentile)

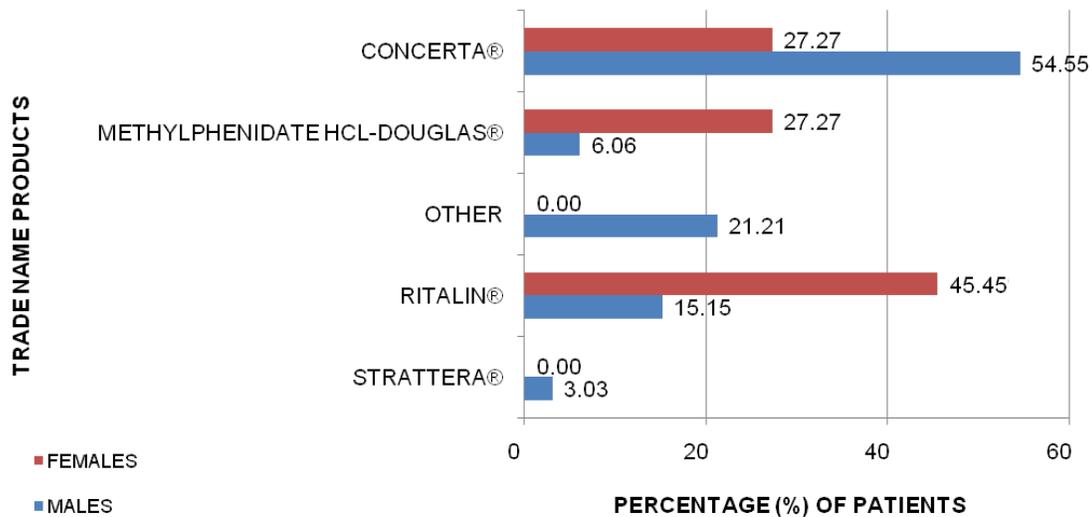


Figure 3. Trade name products patients were stabilised on after a dosage or medication change ($n_{\text{males}} = 33$ and $n_{\text{females}} = 11$)

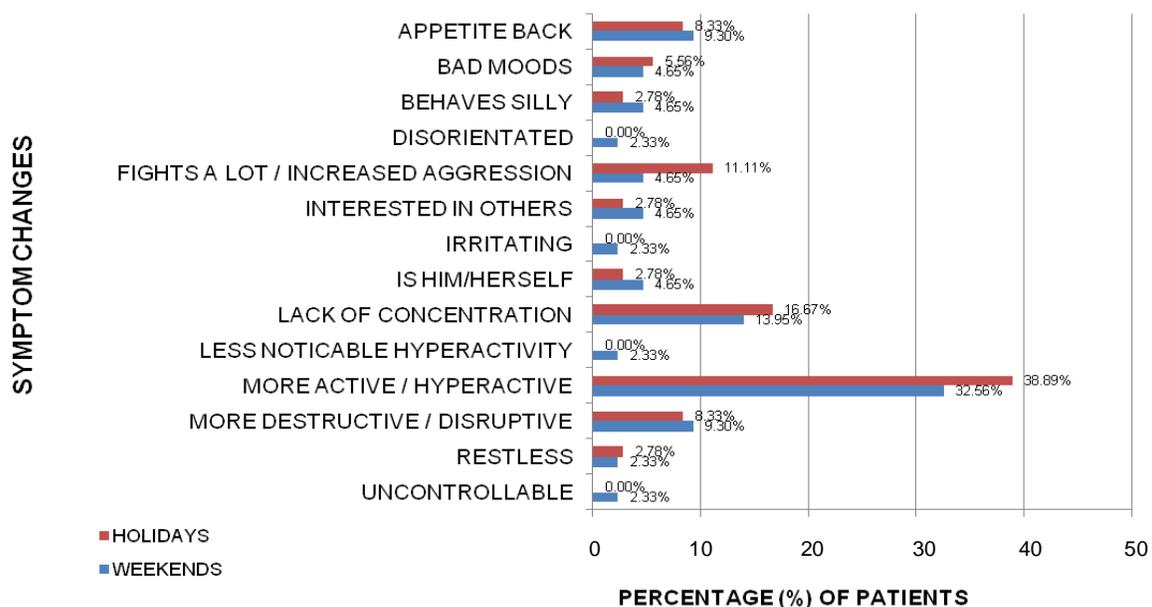


Figure 4. Symptom changes noticed during structured medication-free periods ($n_{\text{holidays}} = 46$ and $n_{\text{weekends}} = 39$)

(Halls and Hanson, 2008) and the averages were either the same or slightly more. It therefore seemed as if no negative effects regarding weight and height have been experienced in this patient sample. Although 42 parents indicated that their children lost their appetite after the initiation of medication, only 11 indicated that their children had actually lost weight since initiating medication. This finding needs to be confirmed in larger studies, since the comparison of the children's height and weight with standard growth charts indicate no major effect. The weight loss may have been a perception by

parents, only a temporary weight loss, or it may have been so small that it resembles normal values. Nearly half of patients went on medication-free periods. These drug holidays for ADHD are recommended in South Africa where possible (SAMF, 2010).

It was also noteworthy that nearly 30% of the mothers indicated that the pregnancy or birth of their child with ADHD was difficult, that 17 of the children or adolescents had 21 family members previously diagnosed with ADHD, and that a high percentage of parents of ADHD diagnosed children and adolescents in this study, were

using antidepressants. Although methylphenidate remains the mainstay of treatment for ADHD, newer and alternative products are available and are actively promoted. Most parents in this study have tried alternative treatments for their children to improve symptom control, but were of the opinion that these treatments should be used in conjunction with pharmacotherapy. It is recommended that larger and more comprehensive studies on the incidence, treatment and care of children and adolescents diagnosed with ADHD be conducted in South Africa, especially studies focusing on drug holidays and the effectiveness of alternative treatments for ADHD.

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