

Original Article

ATTENTION DEFICIT HYPERACTIVITY DISORDER IN ILORIN: SCREENING WITH THE CONNER'S TEACHERS' RATING SCALE

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ABSTRACT

Background: The prevalence of Attention Deficit Hyperactivity Disorder (ADHD) or its risk in North Central Nigeria has not been adequately reported. The consequences of missing the disorder and its co-morbidities are usually costly to the society.

Method: Using a multi-stage sampling technique, nine primary schools from where a total of 1,480 pupils were selected across the three local government areas within Ilorin metropolis (two public and one private school from each LGA) we selected. An ADHD assessment tool - the short version of Conner's Teacher Rating Scale was administered on the pupils through their respective class teachers after training the teachers on how to administer the tool. They were classified into Inattention ADHD and Hyperactive/impulsive ADHD.

Results: Of the 1480 (741 males and 739 female) pupils recruited, public schools contributed 1033 (69.8%) pupils while 447(30.2%) were from the private schools. A prevalence of 15.8% was found for ADHD risk. Statistically significant differences were present in the male to the female distribution of the Inattention ADHD, Hyperactivity ADHD (each with $p < 0.05$) but not in the overall ADHD index($p > 0.05$). The ADHD Index was higher in the public schools. **Conclusion:** Prevalence of primary pupils aged 6-12 years in Ilorin at risk of ADHD is 15.8%, no significant gender variation was found. It is hereby recommended that Pre-primary school entry screening for ADHD should be instituted considered to enhance early recognition and prompt intervention so as to save the country from bad childhood that develops into bad adulthood with its myriads of anti-social and behavioural consequences.

Keywords: ADHD, Conner's Teachers' Rating Scale, Primary School

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INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is a clinical disorder characterized by persistent and developmentally inappropriate levels of inattention and/or hyperactivity and impulsivity¹⁻⁵. Globally, the prevalence has been on the increase². In Benin City, Nigeria, a prevalence of 7.6% was found in a community-based study by Ambuabunos et al⁶. In southwestern Nigeria, Adewuya and Famuyiwa found a prevalence of 8.7% among school children aged 6-13 years⁷.

The few National studies on ADHD are relatively recent and concentrated in the Southern part of Nigeria which has a different setting from the North. ☐

ADHD is a significant public health disorder and has been established to be associated with learning disabilities leading to school failure; as much as 33% of those with the condition are said to be kept back a grade before reaching high school.⁸ Other recognized problems with children with ADHD include poor peer relationship, sleep disorders, increased risk of road traffic injuries and depression and anxiety disorders.⁹⁻¹² It places the child at risk for juvenile delinquency, criminality, substance abuse, and sexual promiscuity with HIV/AIDS and teenage pregnancies as possible consequences. These are problems that are better nipped in their buds. Children with ADHD are also at risk of being misunderstood, thus are prone to be physically abused at times in the name of corrective measures.¹² They can also make their community a high-risk area with its attendant socio-economic disadvantages.

It is common to find Educators who consider the disorder an "excuse" for immature behaviour rather than a medical/behavioural disorder that it is.¹³⁻¹⁵ Without intervention, teachers and administrators may simply label the child as a troublemaker and if the condition is not properly

diagnosed and managed well, such children can become isolated from their peer group, and develop other problems such as depression.¹

Early recognition of ADHD may improve the educational and psychosocial outcome of most affected children.¹⁶ Since children with ADHD are usually aggressive and have anti-social activities; early recognition can save the country a lot of havoc that can be perpetrated through these affected children. The general objective of this study was to determine the proportion of primary school-aged children at risk of ADHD in Ilorin metropolis; while the specific objectives include determination of the subtypes and the gender variation in selected public and private schools in Ilorin. ☐

METHODOLOGY

This was a descriptive, cross-sectional study carried out over a period of eight weeks. Systematic random sampling technique was employed in the subject selection of the school children.

Sample size:

Since the population of primary school children is greater than 10,000, the appropriate (standard) formula for estimating the required (statistically viable) sample size is as detailed below.

$$n = \frac{Z^2pq}{d^2}$$

$$d^2$$

Where:

n = The desired sample size (when the population is greater than 10,000) ☐

z = The standard normal deviate, usually set at 1.96 (or simply 2.0), which corresponds to the 95% confidence level.

p = the proportion in the target population estimated to have a particular Characteristic or condition 8.7% (i.e. 0.087)⁷

$q = 1.0 - p$

d = degree of accuracy desired, usually set at 0.05. Thus, the estimated sample size for viable analysis is:

$$n = 22 \times 0.087 \times 0.913 \div 0.05 \times 0.05 = 127$$

However, since the study is intended to cut across three local Government areas in Ilorin, and to further improve the statistical validity of the sample, a total of 1,480 was studied.

Selection of pupils in each class was done using systematic random sampling. With the aid of the class register, subjects were selected once they met the inclusion criterion which was the age range of six years to 12 years. Minimum of 25 in a class from primary one through to primary six was studied. ⁸

The class teachers in each of the selected schools and classes were trained on the research instrument which was the Conner's Teacher Rating Scale-Revised Short Versions (CTRS-R: S)17 and how it is used for rating. The tool contained all the symptoms of ADHD as detailed below. For ADHD, symptoms of inattention include the following nine symptoms 1,4,10,17

- Fails to give close attention to details or makes careless mistakes
- Has difficulty sustaining attention
- Does not appear to listen
- Struggles to follow through with instructions
- Has difficulty with organization
- Avoids or dislikes tasks requiring sustained mental effort
- Loses things
- Is easily distracted
- Is forgetful in daily activities. Presence of at least any six makes the child predominantly inattentive ADHD

symptoms-wise. Whereas, symptoms of hyperactivity-impulsivity type are the following nine as well;

- Fidgets with hands or feet or squirms in chair
- Has difficulty remaining seated
- Runs about or climbs excessively in children; extreme restlessness in adults
- Difficulty engaging in activities quietly
- Acts as if driven by a motor; adults will often feel inside as if they are driven by a motor
- Talks excessively
- Blurts out answers before questions have been completed
- Difficulty waiting or taking turns
- Interrupts or intrudes upon others.

Also, the presence of at least any six makes the child predominantly Hyperactivity-Impulsivity type ADHD symptoms-wise. These symptoms have been listed in addition to other symptoms that are used to evaluate some other behavioural conditions and analyzed in accordance with the recommendation of the author of the tool. A situation in which a child fulfils six in each of the symptoms categories, the child is said to have combined type ADHD. A raw score was obtained from their scoring by the investigator, then, T-scores were derived from the instrument on the standardized scales for age and gender. The T-scores for Conner's scales reflect what is typical or atypical for that age and gender.¹⁷

Data analysis was carried out with Microsoft Excel and SPSS version 15 software and an interactive calculation tool for chi-square tests of goodness of fit and independence.¹⁸ The ages were already grouped on the Conner's Rating scale thus, the statistical significance of means of continuous variables was estimated using student t-test while those for categorical variables were determined using the Chi-square test. Statistical significance was said to have been achieved when the p-value was equal to or less than 0.05. ⁹

RESULTS

A total of 1480 pupils were studied from nine schools. There were 741 males and 739 females giving a male to female ratio of 1:1. Overall, 303 (20.5%) had features of Inattention form of ADHD while 355 (24.0%) had features of Hyperactivity ADHD while the ADHD index was elevated in 234 (15.8%). (Figure 1)

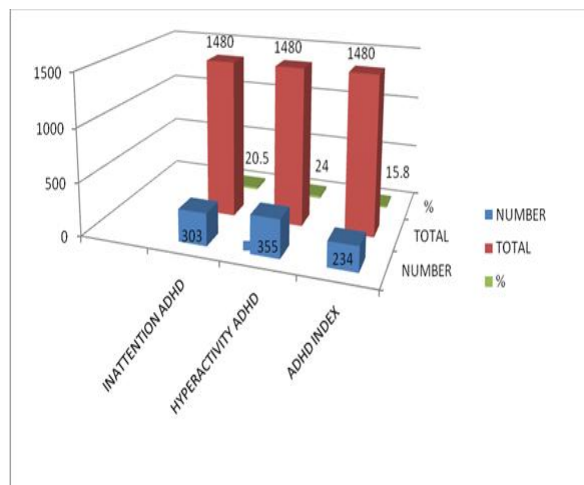


Figure 1: General Distribution of Conner's Assessment Among the Study Population

There were overall statistically significant differences in the male to the female distribution of the Inattention ADHD, Hyperactivity ADHD but not in their ADHD index in the study population as shown in table 1.

The distribution of the inattention and hyperactivity were similar in the public (21.4%) and private schools (18.3%) studied. They showed no statistically significant difference. However, the ADHD index was elevated in more pupils in the public schools (17.4%) compared with the private schools (12.1%) and this observation was statistically significant. Of the 234 (15.8%) with elevated ADHD index, public schools contributed 180 (12.2%) while the private contributed 54 (3.6%). The chi-square and *p* values are as shown in table 1.

Table 1: TABLE I: COMPARISON OF THE STUDY POPULATION WITH RESPECT TO CONNER'S ASSESSMENT

GENDER	MALE	FEMALE	TOTAL	CHI-SQUARE	Degree of freedom	P
	n=741	n=739	n=1480			
Inattention ADHD	124(16.7)	179(24.2)	303(20.5)	12.74	1	<0.05
Hyperactivity ADHD	143(19.3)	212(28.7)	355(24.0)	17.89	1	<0.05
ADHD Index	113(15.2)	121(16.4)	234(15.8)	0.35	1	>0.05
PUBLIC VERSUS PRIVATE	PUBLIC	PRIVATE	TOTAL	CHI-SQUARE	Degree of freedom	P
	n=1033	n=447	n=1480			
Inattention ADHD	221(21.4)	82(18.3)	303(20.5)	1.78	1	>0.05
Hyperactivity ADHD	256(24.8)	99(22.1)	355(24.0)	1.19	1	>0.05
ADHD Index	180(17.4)	54(12.1)	234(15.8)	6.7	1	<0.05

For the males, the findings of Inattention ADHD, Hyperactivity ADHD and ADHD index were statistically significantly distributed across the age groups while for the female gender, Hyperactivity ADHD and ADHD index were not statistically significant while Inattention ADHD was however statistically significantly distributed as shown in Table 2.

Table 2: TABLE II: COMPARISON OF THE STUDY POPULATION WITH RESPECT TO AGE GROUP DISTRIBUTION VERSUS GENDER ON CONNER'S ASSESSMENT

AGE GROUP	6-8	9-11	12	CHI-SQUARE	Degree of freedom	P-value
	n=244	n=351	n=146			
	MALE					
Inattention ADHD	32(13.1)	51(14.5)	41(28.1)	17.01	2	<0.05
Hyperactivity ADHD	36(14.8)	49(14.0)	58(39.7)	48.78	2	<0.05
ADHD Index	19(7.8)	47(13.4)	47(32.2)	43.88	2	<0.05
AGE GROUP	6-8	9-11	12	CHI-SQUARE	Degree of freedom	P-value
	n=213	n=368	n=158			
	FEMALE					
Inattention ADHD	45(21.1)	88(23.9)	56(35.4)	10.83	2	<0.05
Hyperactivity ADHD	61(28.6)	102(27.7)	49(31.0)	0.66	2	>0.05
ADHD Index	33(15.5)	54(14.7)	34(21.5)	3.95	2	>0.05

The distribution of the Conner's parameters in each of the LGA showed statistical significance as shown in table 3.

Table 3: TABLE III: THE PREVALENCE OF DISORDERS IN ALL THE STUDY POPULATION BY LGAs

Name of LGAs	Inattention ADHD (%)	Hyperactivity ADHD (%)	ADHD Index (%)
Ilorin West	65(4.4)	108(7.3)	63(4.3)
Ilorin East	73(4.9)	77(5.2)	61(4.1)
Ilorin South	165(11.1)	170(11.5)	110(7.4)
Chi-square	34.7	12.2	6
Degree of freedom	2	2	2
P	<0.05*	0.05*	<0.05*
Total (1480)	303(20.5)	355(24.0)	234(15.8)

DISCUSSION

The nine schools (public and private) studied were distributed throughout Ilorin metropolis thus the findings are quite representative in the study area. The prevalence of ADHD risk in Ilorin was found to be 15.8%. This is within the range of the findings of earlier workers like Adewuya and Famuyiwa in southwestern Nigeria who found a prevalence of 8.7% among school children aged 6-13 years,⁶ Egbochukwu and Abikwi¹⁰ found a prevalence of 23.15% in Benin, Ofovwé *et al* who found a prevalence of 8.0% also in Benin⁴ and Ambuabunos *et al* in 2011 who found a prevalence of 7.6% in Benin as well.¹⁹ However, a recent hospital-based study on ADHD among children aged two - and 13-year-old that presented to paediatric outpatient clinics found a prevalence of 3.2%. This may be due to hospital-based nature of the study. This study also found no significant difference in the gender occurrence. In comparison with findings in other African countries, Kashala *et al* in 2005 found a prevalence of 6% among school children in Kinshasa Congo.²¹ This may be due to the methodology employed by Kashala *et al* as two behavioural instruments were used: Strengths and Difficulties Questionnaire (SDQ) and the DBD.

This will certainly have some filtering effect in addition to the filtering that the DBD scale would have provided. In South Africa, between 8-10% of school children were said to be suffering from the disorder.²² In Iran, a prevalence of 3-6%, was found and this could be due to the usage of both Teacher's and Parents' Conner's Rating scales in their study.²³ In the United States of America, a prevalence of 3-10% has been documented depending on the ages and tools used.^{1,24-26} In Russia²⁷ and Britain²⁸, a prevalence of 1.3% and 1.4%, were found respectively. In their meta-regression analysis in 2007, Polanczyk *et al* found a worldwide prevalence of 5.29% with a wide variability the world over.²⁹ They also concluded that diagnostic criteria or tool used, the source of information, the requirement of impairment for diagnosis, and geographic origin of the studies were significantly associated with the differences in ADHD/HD prevalence rates.³⁰

Though pre-tested before the study, this might be the first study on ADHD in Nigeria utilizing the Conner's Rating Scale (CRS). Earlier studies utilized the Disruptive Behavioural Disorder (DBD) scale.^{4,6,19} A major difference between the DBD scale and that of Conner's is the separation of age group and gender based on the standard T – score for each subgroup by the Conner's rating scale. This study also surprisingly found no difference between male and the females. Most of the earlier studies showed a male preponderance of the disorder. This observation may just suggest that the CTR scale is more sensitive in identifying female children with symptoms of ADHD especially in view of the T – score values which are generally less than those of the male counterparts age for age. Also, this finding is comparable to those of Kashala *et al* in Congo²¹ and Cardo *et al* in Spain³⁰ where no significant differences were found in the gender distribution. The DBD scale has no dichotomy of cut off for each gender unlike the CTR scale which has different cut-off T-score for different age group, and gender for each age group. It is thus important for more studies to be conducted using the Conner's rating scale as well as on DBD scale to evaluate the

prevalence of ADHD risks and the correlation between the scales.

Inattention (cognitive disorder) either as an isolated observation or in combination with ADHD risk was found in one in every five pupils also with similar distribution in public and private schools. With the current global effort on increasing access to quality education through the Universal Basic Education (UBE) scheme as part of the global effort towards achieving the quality education for all, inattention needs to be tackled as it can militate against achieving the aim of education. If it persists, there may be children who attend schools but are never educated due to symptoms of inattention ADHD.

Hyperactivity either as an isolated observation or in combination with ADHD risk was found in one in every four of the studied population. When adequately managed, children with symptoms of hyperactivity ADHD can be converted to an advantage for the country and several sportsmen and women can emerge from this group of children.¹¹ However, when missed, they have difficulty with schooling and make schooling difficult for other children. It has also been established that inability to inhibit behavioural responses in them leads to risk-taking behaviours such as drug and alcohol abuse, tobacco smoking, pre-marital and promiscuous sex.^{31,32} They may later grow to develop driving anger and traffic offenders. Accident proneness, compulsive buying and flair for tattooing and body piercing may be other common problems with them.^{3,31,32}

Conclusions and Recommendations

Prevalence of ADHD risk in Ilorin metropolis is 15.8%. Presence of symptoms of inattention and those of hyperactivity were more common in the female but their ADHD index was comparable to those of the male gender thus, no significant variation was found in the prevalence of ADHD between males and female pupils. There were more pupils with ADHD risks in public schools compared to private schools.

From the foregoing, it is hereby recommended that school entry screening for ADHD should be instituted to enhance early recognition and prompt intervention. Nationwide epidemiologic studies to determine the national prevalence of ADHD risk and ADHD across various age groups using Conner's rating scale, as well as the DBD, should be conducted especially at the local government level. Estimation of the prevalence of ADHD among secondary school students should also be carried out. ☐

Limitation: The fact that the teachers were entrusted with the questionnaires was the main limitation however, they were trained on the use of the questionnaires and the interpretation was left to the principal investigator. The use of a short version of the Conner's rating scale as the sole instrument was another limitation though this has been found to be adequate especially when faced with parental illiteracy and the need to complete the study on time. Specific ADHD diagnostic tools were not available thus future studies should be further carried out on children identified with ADHD risk with Conners' rating scale. ☐

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